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Controlling Production in a Foundry

Simple System Employed by Cincinnati Plant
to Synchronize Purchases of Raw
Materials with Output

BY BURNHAM FINNEY*

EVERY foundry aims to maintain intelligent control over manufacturing operations and to synchronize buying of raw materials with production needs so that there is always a proper relationship between the two. The machinery making such a system possible should be set up in such a way that unnecessarily intricate keeping of records and statistics is avoided.

With these observations in mind, it is interesting to examine the way in which Aluminum Industries, Inc., Cincinnati, manufacturer of aluminum castings, has met these problems. Red tape has been cut. Substituted in its place is a comparatively simple method by which production control is effected from the time that raw materials are ordered by the purchasing department until they go out from the shipping room in the form of finished products. The system concerns itself also with the relationship of the company to its workmen, starting with the employment of the latter and ending with the distribution of wages. From it manufacturing costs can easily be computed. A thorough understanding of the way in which the system functions, however, can be obtained only by describing it in considerable detail.

Information regarding the metal consumption in the

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company's piston foundry and in its jobbing foundry is compiled daily. For use in the company's laboratory, a daily report is made out in triplicate which tells the number of pounds of metal used in each of the foundries. On the report

is a separate column for each kind of metal used for proper alloying. The report on the foundry is also utilized by the metal stores clerk in making his daily summary.

An accurate account is kept of the scrap produced in the piston foundry, the items being divided into the various scrap classifications. Here the report is in duplicate and is principally for use in the laboratory. The scrap material produced in the foundry is kept track of by means of a hot inspection report, which is tabulated by an inspector for each heat run. This sheet is posted against the foundry daily production report and also goes to the cost department for its information. In order to know where scrap material is taken after it is assorted, the department superintendent receiving any of it must sign a delivery ticket, which is sent to the cost department.

When an order is received for castings, a foundry work order in the form of a small

card, 3 in. x 5 in., is issued to the cost department for posting in the ledger. On one side are spaces for recording the date, the number of the order, the

THE Finishing Order Is Made Out in Triplicate. The first copy is filed in the office, the second going to the stockroom where rough castings are stored. The latter then follows the castings through the grinding department to the packing room, at which point it is destroyed. The third copy goes to the inspectors who pass upon the merit of the completed castings awaiting shipment. From these slips a summary is tabulated and the finished stock ledger is kept up to date. Copies Nos. 2 and 3 are identical except that one is marked "Order Department Copy" and the other "Delivery Copy"

quantity of castings, the castings number, the amount of good material and the amount of scrap, the reason that the scrap was made and the date of the delivery of the castings to the stockroom. The planning department notifies the foundry what the order calls for and provides the foreman with the order number. On the back of the card the daily production against this particular order is noted. When production is completed, the factory foreman informs the planning department, which in turn notifies the cost department.

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As a summary for reference in the production and

In the various stockrooms throughout the foundries records are kept of the material received and of that issued, together with the amount on hand. From the record cards is made up a monthly inventory, which is turned in by the stock clerks to the management. The cards themselves, however, provide a perpetual inventory, and the stock on hand at any time can be easily determined.

In case that a department must call upon another department for material, the head of the department making the request must fill out a requisition order, which is sent to the department furnishing the supplies. Entries in office ledgers are made from the requisition sheet, which is filed with the stockkeeper.

How Supplies Are Bought

Any foreman or other executive who desires goods bought by the purchasing department fills out a purchase requisition in duplicate and dispatches it to the purchasing agent. After the goods are ordered, the original copy of the requisition goes to the cost department and the other to the receiving clerk. In placing

[illegible]

A Daily Summary of Stores Disbursements Is Kept for Withdrawals of Supply Castings, Rough Castings and Semi-Finished Stores

planning departments, the cost department prepares a daily production record detailing the good material and the scrap coming from every department in the plant.

Prepare Daily Summary of Disbursements from Stock

To have up-to-the-minute data regarding the disbursements of stock, a daily summary is made. A small report card is used to set down the disbursements of the packing department, and of "Kant-Skore" and "Permite" pistons issued from semi-finished stock. For disbursements of raw materials, supply stores and rough castings, a large card is filled out. The summaries of packing supplies and of raw materials are turned in to the cost department monthly, but those for semi-finished stores, supply and rough castings are reported daily.

Keep Perpetual Inventories of Raw and Semi-Finished Materials

Each day the stores clerk makes out a raw material stores inventory sheet for use in the purchasing department. This constitutes what might well be termed a perpetual inventory, for at a moment's notice the amount of raw material on hand can be ascertained. At the end of the month a copy of this report goes to the cost department in order to check against ledger statistics. For semi-finished pistons only, a weekly inventory is taken for the use of the planning department, which has charge of routing material through the plant.

an order the purchasing department sends out what is termed a purchase order, a duplicate of which is filed by the department and a third copy of which is sent to the cost department for checking against invoices.

Upon delivery of material to the plant the receiving clerk makes out a "receiving sheet." The original copy goes to the cost department, and a second copy is used for the receiving department files, together with the packing slip attached to the material. If the goods, when received by the department to which they are consigned, are not satisfactory, a "returned goods shipper" slip accompanies them to the shipping department, with the proper shipping instructions. A copy of the slip is filed with the purchasing department. After return shipment to the manufacturer has been made, the original copy of the slip is sent to the purchasing department, which turns it over to the cost department for invoicing or for posting the proper credit for returned goods.

How Company Handles Returned Goods

Whenever the company's own merchandise is returned by a customer, a returned goods report is made out in triplicate by the shipping clerk. Blue and yellow copies go to the sales department, but a white copy remains with the merchandise. After disposition of the material has been decided upon, both the blue and white copies are put with it and are marked "O. K.," or "inspect and stock," or "junk." After these instructions are carried out, the blue and white copies are destroyed. The yellow copy is retained in the office

STOCK Cards Are Used in the Various Stock Rooms to Maintain a Perpetual Inventory. From these cards monthly inventories are made out and are turned in to the management by the clerks in charge of supplies.

DIRECT Labor Time Cards Are Used in All Departments. They go to the cost department, where they are checked in making up the payroll

WHEN a Minimum Inventory Is Reached in Stocks of Finished Parts, a Machine Shop Order Goes to the Stock-keeper, Who Makes Out a Route Card for the Castings to Be Machined.

MACHINE SHOP ORDER 2250

ORDER-MS. _____
 DATE _____

DESCRIPTION _____
 SERIAL NO _____
 QUANTITY _____

ISSUED BY _____
 FOREMAN _____

DATE REC'D _____
 STOCKKEEPER _____

O. K. _____ Recd. _____

Whenever a workman is hired by the company, an employment card is made out by the foreman or the head of the department to which the workman is assigned. The card goes to the superintendent for his approval and then to the cost department, where it is filed. On the back of the card are recorded the rate increases granted the workman and the dates on which the new wage schedules became effective.

Direct labor time cards are used by all departments. They are filled out in some instances by the men them-

[illegible]

A card similar to the one just described is utilized to record indirect labor, all of which must be listed and itemized. Those engaged in indirect labor include all laborers throughout the plant, inspectors, and department and company executives. The routine through which this card passes is the same as that of the direct labor time cards.

Work in process--foundry
Work in process--machine
Work in process--finishing
Work in process--tool room
Repairs in process
Foundry supervision
Machine supervision
Tool room supervision
General factory--indirect labor
Foundry--indirect labor

Machine—indirect labor
Finishing—indirect labor
Machine set-up
General factory—inspection
Foundry—inspection
Machine—inspection
Finishing—inspection
Packing and shipping
Cost department

Handling Requests for Service from the Tool Room

One of the most difficult problems for many plants to handle in a simplified, yet accurate, manner is to handle requests for tools, fixtures, repairs and for other work of a miscellaneous nature. Here three forms suffice in keeping records and in controlling this situa-

tion. Any executive desiring tools, fixtures or repairs in the tool room makes out a request on a standard sheet supplied him for that purpose. After approval by the superintendent, two copies are dispatched to the engineering department, if necessary, and thence to the planning department. They move from the latter to the cost department for entry in the ledgers and for an order number. The original copy is sent to the tool room and the second copy goes back to the planning department for follow-up. After completion of the job, the original copy is returned to the planning department with a notation on the back indicating the material used. Both copies then go to the cost department, where they are filed for reference.

With one or two minor exceptions the same process is followed in having work done by the maintenance department. Requests for mold changes also are subject to the same routine, and here the executive asking for the change must state specifically what alterations are to be made and the reasons for making them.

Sales Record Used as Basis in Planning Production

For records of monthly sales a single card is made out for the use of the sales department in conjunction with the planning department. When the minimum inventory is reached, the planning department issues to the cost department a machine shop order for recording in the ledgers. This order passes to the stockkeeper, who makes out a route card and makes the proper disposition of the castings called for. Both the route card and the order pass to the machine shop foreman, who keeps the latter until the job is finished. The former follows the work through the machine

shop. Both are checked for scrap after semi-finished inspection and are sent to the planning department for recording. They then pass to the chief inspector for checking purposes and to the cost department for closing the order.

Shipping Orders Made Out in Triplicate

Shipping orders are made out in triplicate in the office. The original white sheet remains there, the pink and blue sheets going to the head of the stockrooms, who fills the order from the pink copy. The merchandise is placed on the shipping room floor with the pink copy attached. The blue copy is kept in the stockrooms for the record files. When shipment of the merchandise is made, the shipping date and other necessary information are inserted on the pink copy, which is returned to the billing department in the office to be checked against the white copy to see that all items have been taken care of. Billing then is made from the white copy. In the order department the pink copy is filed numerically by order number, and the white, according to the customer's name.

Benefits accruing from the system outlined above are manifold. The necessity for a large clerical force is eliminated. Accurate and speedy compilation of manufacturing costs is possible, and a constant and perpetual inventory of raw and semi-finished material is provided for. The system takes into account also the need for complete supervision of all parts of the plant. Finally, it definitely fixes responsibility for every operation, with the production and planning department as the key department.

Where Are We Going in Metallurgy?

Progress Has Not Been Retarded—Present Scope of Alloy Steels—
Important Work with X-Rays

BY DR. F. C. LANGENBERG*

A GREAT many people believe, and possibly quite correctly, that, in the past, scientific explanation of metallurgical accomplishment has followed a development rather than a practical result, having been preceded by a scientific study. Although this may be true, it is decidedly questionable whether this condition was, or is, any more prevalent in the metallurgical field than in any other line of endeavor. Most assuredly scientific research in metallurgy is being given a great deal of prominence at the present time, and every effort is being made to apply physical chemistry and the other sciences to the art of metallurgy.

Metallurgy Not 20 Years Behind

The statement has been made that metallurgy is at least 20 years behind the other sciences in development. When one witnesses the operations in a modern producing plant engaged in the manufacture of steel and steel products, most certainly the conclusion must be arrived at that such a statement is ill founded. Science has very recently given new tools to the metallurgist, and it must always be the duty of anyone engaged upon metallurgical development to seek out these new tools and apply them properly, refraining, however, from the development of abstruse theories which will never be of any benefit to mankind.

It has been the author's pleasure to have been intimately associated with a number of metallurgical developments during the past several years, in which new tools and methods of investigation have been applied. The results may or may not be of permanent value, but they are at least of interest at the present time.

Alloy steels were formerly confined very largely to production of ordnance. Following the World War, this condition was entirely reversed and the alloy steel tonnage was very largely consumed by the automotive and other industries. It is of particular interest to

note that Canada is to the forefront in the application of nickel steels to the railroad industry.

Alloy steels have suffered, and probably always will suffer, to a certain extent from quack recommendations made by those who are not familiar with the effect of various alloying elements. Regardless of this fact, it is believed that the use of alloy steels will continue to expand, but this expansion can never be on a permanent and sound economic basis until the consumer realizes that a quality steel must of necessity be more expensive than steels of so-called commercial quality, and that the plants engaged in their production are entitled to a just and fair return which will compensate them for their research endeavors. Research in metallurgy must cease to be an advertising medium and become instead of real assistance in the manufacture of quality products, and at the same time bring about this production at the lowest possible cost.

What X-Rays Are Doing

The X-ray machine for detecting defects in steel castings, and the X-ray defraction machine for the determination of atomic structures, may prove to be of permanent practical value.

Certain data are presented which have been obtained with equipment of this nature with the hope that those hearing the results may be able to decide for themselves whether these facts can be applied to their own problems. One of the newest applications of the modified X-ray tube to metallurgy is the bombardment of metals and other substances by a stream of electrons. Evidence was presented showing complete recrystallization of metals without the application of heat. The entire readjustment of crystalline structure was brought about by the electron bombardment.

The author's frank reply to the question indicated by his subject, "Where Are We Going?" is that he does not know; but he presented certain new facts with the hope that others will be able to utilize these data in arriving at the final solution.

*Abstract of a paper delivered at the University of Toronto Steel and Power Show, Toronto, Canada. The author is vice-president Climax Molybdenum Co., New York.

National Metal Week at Detroit a Notable Event—Many High Grade Technical Papers—Exposition Sets New Record



SURPASSING in significance and size its previous conventions, the American Society for Steel Treating brought together a gathering of American technical men which, in a way, was epochal. It was the occasion of the ninth annual convention and exposition of the steel treaters at Detroit last week, Sept. 19 to 23. Associated with that organization were the American Welding Society, the Society of Automotive Engineers, and the Institute of Metals, so that in all the over 3150 society members assembled there included 2533 steel treaters, 425 members of the welding society, 105 non-ferrous men and about 100 automotive engineers. The steel treaters' registered attendance was approximately 55 per cent of the total membership.

A high standard characterized the technical programs. Several new developments in metallurgy and heat treatment were made public.

Imposing in its diversity, comprehensiveness and size was the Steel and Machine Tool Exposition, to be known hereafter as the National Metal Exposition.

Only the chief features of such an event can be touched on in the following pages, which treat specifically of the steel treaters' convention and of the exposition.

Technical Papers Were of High Standard

MARKED interest was manifested in all the technical sessions of the steel treaters, both as to attendance and discussions. In some cases there were 400 to 500 present, particularly at the opening session and at the steel melting session. Viewing the program as a whole, there were two features: Papers deal-

ing with steel melting and with tool steels. Besides these, the various sessions included many heat-treating papers and special subjects in which heat treatment is a factor. Of the forty-four papers, only some of the important ones can be reviewed in this report of such a stupendous program.

Steel Session—First Principles of Making Good Steel

AT Cleveland in 1925 the first technical session in steel melting practice was introduced on the program. At the third one, this year, which, incidentally, also proved eminently successful, two papers stand out of decided general interest: "Steel Melting Practice for Large Ingots and Heavy and Light High-Grade Castings" by W. H. White, Duquesne Steel Foundry Co., Coraopolis, Pa., and "The Melting or Molten Stage of Steel Manufacture with Particular Reference to the Deoxidizing, Refining and Contamination Phases" by G. A. Dornin, Gathmann Engineering Co., Baltimore.

Making Good Ingots and Castings

IN the past few years the rigid requirements demanded by the user of steel have broadened the knowledge of steel-melting practice along with the other metallurgical operations, said Mr. White in his paper.

The greatest progress has been made through the study of slags, as superrefinement can only be accomplished through ideal slag conditions. The art is not making steel, but making slag of the right volume, consistency and composition, the intimate relationship of slag to steel being the blanket that protects the bath from oxidation and gathers in the impurities of the steel through chemical reactions that are waiting to be controlled to a nicety by the melter.

Skill must begin in the stock yard and hold throughout to the tapping of a heat, the charge must be selected with the proper balance of elements, the melting must be done with rapidity and the refining carried to the degree that gives the correct slag condition

which in turn produces the cleanest and quietest heat of steel.

Slags Have Definite Character

The basic electric offers the most work in slag making and the white disintegrating, carbide smelling, low iron and manganese slag with FeO and MnO under 3 per cent is its standard, while the basic open-hearth rates second and the slag should be velvety in appearance in the furnace, solid and not spongy when cold and a dark gun metal color as free from iron as possible with FeO and MnO under 40 per cent.

The acid open-hearth rates third because it is more or less self adjusting. Its slag should be creamy in appearance in the furnace, carrying the characteristic frog eye bubble near the finish of a heat, viscous when hot, solid when cold, light pea green in color and under 35 per cent FeO and MnO.

Alloy steels such as chrome, vanadium and manganese will affect the slag conditions, but the art is to produce a slag that will be as free as possible from the metals keeping them in the bath where they belong.

The last test from the furnace or the ladle on high-grade deoxidized steel should show no ebullition of gases, be concave in the mold or spoon, and should be solid throughout.

Discussion

While not agreeing with all the author's statements, J. M. Adams, Midvale Co., Philadelphia, characterized the paper as a good, practical one. Between basic and acid electric furnace he felt there was little choice; he might prefer the acid. It was his feeling

Authors of Some of the Technical Papers



H. C. KNERR



S. P. ROCKWELL



G. A. DORNIN



W. H. WHITE

that not enough attention is paid to temperatures in the furnace and in pouring; quality depends largely on temperatures.

In response to a question, as to manganese and silicon additions, the author emphatically stated that to make good steel in the acid open-hearth, the silicon should be added to the bath 10 min. before tapping, followed by the manganese. Steel should be made in the furnace, be tapped at the right temperature and no aluminum used.

Keeping Down the Presence of Iron Oxide

A VALUABLE contribution to certain phases of steel-melting practice, particularly basic open-hearth, was the paper by G. A. Dornin. His main emphasis was on the extreme necessity and value of keeping the percentage of iron oxides in both the slag and the metal bath as low as possible. After discussing their bad effects, he cites the only known methods for their removal. The three major stages of steel making are pointed to as:

Melting or molten stage
Ingot or solidification stage
Working or treatment stage

which he discussed in turn. He insists that practically all evils of steel making can be traced to the presence of oxygen in some form in the solidified product and that the best steel is that which contains the least oxygen.

Discussing the processes, the author rates them as follows in their ability to make sound, clear steel: Crucible, open-hearth, Bessemer. The electric furnace he describes as a type of open-hearth.

Two written discussions were presented: One by W. H. White, author of the previous paper, and another by Dr. C. H. Herty, Jr., Bureau of Mines, Pittsburgh. In part they follow:

Ingot Mold Design Important

Because it deals with the principal cause of most steel failures, Mr. Dornin's paper should appeal to steel makers, said Mr. White. Next to proper slag making, the most important factor in the production of high-grade forging ingots is ingot mold design, perhaps not duly emphasized by the author because of his connection with an ingot mold company. When a heat has been made as free from oxides as possible, the quicker it solidifies the greater the distribution of these oxides through the body of the steel, thus preventing their collecting in any particular location through the center of the ingot. This is done by cold pouring and heavy ingot mold chill.

The only way to defeat the defect known as flakes or oxide spots, especially in nickel or nickel-chrome steels and in large and small gun shells, pipe molds and other forgings, is to study the three major practices in making steel: Conditioned slag, correct pouring temperature and large ingot mold chill. These spots are not caused by forging, rolling or treatment.

Some of the Authors at Technical Sessions



R. W. WOODWARD



B. H. DE LONG



D. M. HOUSTON



F. R. PALMER

The so-called oxides, sonims, or non-metallic areas break the continuity of grain growth, and this never welds through forging or treatment and is later the cause of test bar failure.

Research Needed on Oxidation

Two important facts are brought out by Mr. Dornin in his most valuable contribution: First, the influence of iron oxide in the slag on the contamination of the metal, and second, the need for research on the subject of oxidation, contended Doctor Herty. The three common deoxidizers, silicon, manganese and aluminum, are fairly well understood as to their deoxidizing power. Quantitative information is, however, lacking and there is little knowledge of the usefulness of combinations of the three. Silicon-manganese has been used to some extent in recent years, but no one knows that the ratio of manganese to silicon in this alloy is the best as far as deoxidization and removal of products of deoxidation are concerned. There is every reason to believe that other combinations of silicon and manganese, silicon and aluminum, manganese and aluminum and ternary combinations will prove to be

Classifying the electric furnace as a phase of the open-hearth clouds the issue, said John E. Arthur, Union Electric Steel Corporation, Pittsburgh, in a written discussion. As to contamination by oxide of iron, the basic electric would stand out preeminent. Of decided importance also is the character of the ladle lining.

Chairman Radclyffe Furness, Midvale Co., Philadelphia, was urged to throw some light on the points brought out. He agreed that the electric furnace might be regarded as a phase of the open-hearth, differing largely in application and intensity of heat. Its weakness, he felt, was the presence, usually, of a layer of molten metal at the bottom, caused by the lack of action in the bath.

In a general discussion of considerable interest at the close of the session, G. Batty, Sheffield, England, offered some very important comment based on his experience in steel making, particularly with the basic electric furnace for steel castings. His remarks in detail will be available later in the *Transactions* of the society. It is unquestionable, according to him,

British and American Metallurgists

DISTINGUISHED for her work in single crystals as well as in other fields, Miss Elam is doing special research in pure science at the School of Mines, London, England, where she has worked under Prof. H. C. H. Carpenter, noted British metallurgist. She has a fellowship in metallurgy there administered jointly by the Worshipful Company of Armourers and Brasiers and the Royal Society of London, now bestowed for the third year. She came to Detroit from the excursion of the Mining Congress in Canada and will visit various American plants—all under a grant from Sir Robert Hadfield.

Miss Clark is a metallographist for the Western Union Telegraph Co., New York, and a graduate of Massachusetts Institute of Technology. She was chairman of one of the technical sessions. Only one other woman is a member of the society.



FRANCES HURD CLARK AND CONSTANCE ELAM

far better in giving maximum cleanliness to steel.

Doctor Herty then goes into more detail discussing certain theoretical principles, such as slag oxidation with reference to contamination of the metal, including some comments on certain passages in the paper.

Electric Steel Equal to Crucible

H. M. German insisted that, if properly carried out, electric steel is the equal of any crucible steel. Most evils are due to oxides, making it urgent to consider the electric as separate from the open-hearth process.

that high-grade castings can be made economically by that process, if all its advantages are observed.

American Ingot Iron

SOME recent and interesting data on the well-known product of the American Rolling Mill Co. were presented by Reid L. Kenyon, research associate of the company at Middletown, Ohio, in a long paper, "Armco Ingot Iron." Its microstructure, hardness and other properties after various treatments are a feature of the paper.

Tool Steel—New Facts and Applications

TOOL steel was prominent in the major part of one session, presided over by Dr. John A. Mathews, and there were one or two papers at other sessions on this topic. Types of high-speed steel were prominent, as well as new facts or applications of other tool steels.

A New Test for High-Speed Steels

THE use of the milling cutter test for evaluating high-speed steel is advocated and explained by J. B. Mudge and F. E. Cooney, engineers Western Electric Co., Inc., Chicago, in a paper "Evaluating Quality in Heat-Treated High-Speed Steel by Means of the Milling Cutter." Realizing that in this or any other test, all variables other than the steel and its heat treatment should be minimized to the point where results can be duplicated, so as to be free from adverse criticism, the authors present results of a thorough investigation. A feature is the use of a recording watt meter for which the authors enumerate nine different advantages for the test. Among the conclusions of the authors may be mentioned:

Cutters of the same steel and hardened by the same method checked within limits that are suf-

ficiently close for test purposes; no cast cutter has been found to give results comparable to standard high-speed steel, refined by suitable working; cutters hardened by patented or salt bath processes have not given results comparable to standard high-speed steel, hardened by the open-fire method, and in only a very few cases has the cutting efficiency of the tools failed to increase from the first to the third, fourth or fifth grind, with the maximum at the third or fourth grind.

Particularly significant is the emphasis placed by the authors on the mechanical engineering phases of their work, said Jerome Strauss, Washington Navy Yard, Washington, in a written discussion. The design of the cutter and the method of testing confirm the writer's own experience during the last seven years. The general method used is unquestionably best for milling cutter tests. The parallelism between carbide segregation and tool performance in the author's earlier tests and the absence of such a relation in the present cutters, which are presumed to be relatively freer from segregation, point to the possible existence of a degree of segregation above which segregation is no longer the controlling factor in tool performance.

This in turn indicates a very simple method for the inspection of the raw material.

It was also brought out in discussion that in the last three years carbide concentration has been measurably cut down.

High-Speed Steel Now Used for Hack Saws

AN important contribution to a new use for high-speed steel is contained in a paper by Henry B. Allen, Henry Disston & Sons Co., Philadelphia, entitled "Development of High-Speed Steel Hack Saws or Cutting-Off Saws."

Some interesting properties of high-speed steel not usually apparent when dealing with the customary heavier sections are the result of a hardening process discussed by the author. The steel is shown to be plastic for some time after hardening, even when above a hardness of 62-C. Rockwell. Full hardness is not attained for a considerable time after becoming quite cold. Mr. Allen presents the relative performance of saws made of high-speed steel and low tungsten steels.

Adverse criticism of the practicability of high-speed hack saws was indulged in by H. M. German, who asserted that some of them crack, due to brittleness, before being worn out and that the full benefit of such saws cannot be gained because they are not used at high temperatures.

Mr. Allen rejoined with the statement that their use is increasing very rapidly and that well heat-treated high-speed steel is very tough. Doctor Mathews offered the opinion that it is too early to know what developments will be in this field and cited experience in the early days with drills.

When High-Speed Steel Is Quenched

ANSWERING the question "What Happens When High-Speed Steel Is Quenched?" B. H. De Long and F. R. Palmer, metallurgists Carpenter Steel Co., Reading, Pa., offered some interesting observations at one of the sessions. The metallography of high-speed steel, when tempered at 1100 deg. Fahr. after cooling during quenching of various temperatures below 1300 deg. Fahr., is the main subject dealt with. The authors find that as a result of their study, high-speed tools tempered (drawn) at the first mentioned temperature before being allowed to become sufficiently cold in the quench are brittle due to mixed structures; also that high-speed tools may be readily straightened during quenching at temperatures between approximately 1300 and 700 deg. Fahr., and they suggest a method for determining whether such tools had been quenched to a sufficiently low temperature before tempering. A number of photomicrographs are offered, as well as a

chart, giving the Brinell hardness of high-speed steel during quenching and tempering in a wide range of temperature.

In the general discussion that followed this paper, exception was taken to the statement that tools should not be allowed to become cold before drawing. In large production shops, tools often stand over night before they are drawn. The author insisted, however, that cooling to room temperature before drawing results in losses which are greatest in the case of large tools. Other points brought to light were that, as the section of a high-speed tool becomes larger, the rate of increase in cooling becomes more important, often forcing the tool maker to resort to the use of an air blast or baths of oil or molten salt.

Cold-Heading Tool Steel Ball Dies

HREAT treatment as applied to the heading of ball dies of plain carbon tool steel was discussed in a paper by Frank L. Wright, metallurgist Atlas Ball Co., Philadelphia, entitled "A High Temperature Quenching Treatment Applied to Cold-Heading Ball Dies of Plain Carbon Tool Steel."

Doubling the life of dies by increasing their fatigue resistance, to or beyond the point where the dies wear or deform larger, is the result of increasing the quenching temperature from 1470 to 1620 deg. Fahr., followed by a suitable tempering treatment, says Mr. Wright. The paper contains a comparison of the results of endurance tests on dies made from six selected bars of carbon tool steel with the normality of the tool steel as determined by the McQuaid-Ehn carburizing test. The comparison also includes hardness penetration. The detailed heat treatment is discussed, as well as the quenching equipment.

Doctor Mathews called attention to the importance of this paper in that it is the first time this subject has been thus discussed. A. H. D'Arcambal, Pratt & Whitney Co., Hartford, Conn., asked whether dies of 2 per cent carbon and 12 per cent chromium steels had been used, to which the author replied in the negative because of cracking, stating that alloy steels are not used. Mr. D'Arcambal confirmed the author's experience by stating that for nuts only five to a die was obtained from alloy steel dies, while 5000 had been produced with carbon steel.

Double Carbides in High-Speed Steel

A SWEDISH contribution, "On the Double Carbide of High-Speed Steel," by Dr. Arne Westgren and Gosta Phragmen, Metallografiska Institutet, Stockholm, Sweden, was read by Dr. Zay Jeffries.

Special Papers Presented at Other Sessions

BESIDES the sessions on steel melting and those in which tool steel papers were predominant, there were several other meetings at which many important papers were delivered and discussed. One important session was devoted to the carburizing of steel at which five papers were presented, entitled "A Critical Study of the Bend Test as Applied to Iron and Steel," by A. B. Kinzel, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.; "Gas Carburization of Steel," by R. G. Guthrie and Dr. O. J. Wozasek,

Peoples Gas Light & Coke Co., Chicago; "Carburizing Iron by Mixtures of Hydrogen and Methane," by W. P. Sykes, General Electric Co., Cleveland; "Fatigue Tests of Carburized Steel," H. F. Moore and N. J. Alleman, University of Illinois, Urbana, Ill.; and "Studies of Normal and Abnormal Carburizing Steels," by O. E. Harder, L. J. Weber and T. E. Jera-bek, University of Minnesota, Minneapolis.

Some of the other important subjects are reviewed briefly in the following columns.

Hardened Steel—New Light on Constitution and Properties

STRIKING properties of certain carbon and alloy steels were dealt with in a very important contribution by W. P. Sykes and Dr. Zay Jeffries, General Electric Co., Cleveland, in a paper entitled "On the Constitution and Properties of Hardened Steel." Some most interesting facts regarding the change in volume and other phenomena are brought out by this paper, a brief abstract of which follows:

The authors describe an investigation of the

changes in hardness of freshly quenched steel taking place at above and below room temperature. In order to correlate hardness changes with changes in certain other properties, some measurements were made on electrical resistivity and volume.

Freshly quenched high-carbon steel, when maintained near 0 (zero) deg. C. does not change measurably in hardness for several hours. It hardens, however, if cooled below or heated above this temperature. The hardening on cooling is relatively independent of time but dependent upon the temperature reached. This hardening is accompanied by an increase in vol-

Chairmen of Four of the Sessions



RADCLYFFE FURNESS



DR. J. A. MATHEWS



A. H. WHITE



F. P. GILLIGAN

ume. It is clearly due to austenite transformation. In one alloy steel tested, the resistivity increased when austenite transformed, but in the carbon steel the resistivity of martensite is apparently less than that of austenite of the same composition.

The hardening produced by heating above about 0 deg. C. is a *time-temperature* phenomenon. The higher the temperature, the shorter the time required for a given small hardness increase, at least up to 100 deg. C., and presumably up to a somewhat higher temperature. At 50 deg. C., 75 deg. C., and 100 deg. C., the hardness rises to a maximum and then decreases with more prolonged aging. The time required to reach maximum hardness for any temperature is longer, the lower the temperature.

The capability of "age" hardening above 0 deg. C. is not lost by previous hardening, produced by cooling below 0 deg. In fact, the "age" hardening at room and certain higher temperatures is greater after hardening by immersion in liquid oxygen. These two hardening effects not only obey different laws as to *rate of hardening* but they are *additive*. The maximum hardness is obtained therefore by allowing both changes to take place. A higher hardness value is obtained by allowing the retained austenite to transform prior to aging than vice versa. This and other observations suggest that the "age" hardening is largely in the martensite. The "age" hardening at room and higher temperatures is accompanied by *decrease* in volume and in electrical resistivity.

The maximum Rockwell "C" hardness values obtained on the carbon steels were 70.1 on a 1.23 per

cent and 70.2 on a 1.58 per cent carbon steel. These steels were quenched from 850 deg. C. in a 10 per cent caustic soda solution kept at about 0 deg. C. They were then immediately immersed in liquid oxygen for 5 min. and aged at 50 deg. C. for 150 hr.

Aircraft Metallurgy and Heat Treatment

CONTRIBUTIONS to the increasingly important subject of aircraft were presented at the first session on heat treatment by Horace C. Knerr, consulting metallurgist, Philadelphia. His paper entitled "Aircraft Metallurgy" was an interesting summary of the latest developments in this field.

Stating that aircraft construction is definitely becoming a metal-working industry and is one which calls for the utmost in materials, processes, workmanship and design, the author emphasized that the application of the best metallurgical practice is a large factor in success. The paper outlines the metallurgy involved in aircraft manufacture, including a discussion of the choice of materials; the specifications for their purpose and inspection; the properties of the principal metals used; the processes of machining, forming, riveting, welding, brazing, foundry practice and corrosion prevention, as well as a review of the methods of metallurgical control. Causes of failure and their prevention are treated and an illuminating example is offered of the results of the application of correct principles in reducing the rejection of metal parts during fabrication.

After a detailed and comprehensive summary of

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Nominees for President and Treasurer for 1928



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the discussion of the foregoing main points, Mr. Knerr presented on the screen a table of the results obtainable by the application of the principles which he discussed, as illustrated by the heat treatment records of a large aircraft factory over a period of four and one-half years. The table, as here presented, is based



R. M. BIRD
Recipient of Past-
President's Medal



W. B. COLEMAN
Chairman Meetings and
Papers Committee

on the fact that all work was rigorously inspected after heat treatment by an unbiased inspector, failure to fall within specified rather narrow limits as to hardness, cracks, warping, excessive scale, etc., being causes for rejection. The value of the individual parts ranges from about 25c. to \$250, averaging probably about \$25 each.

Table of Heat Treatment Log of Naval Aircraft Factory

Period	Total Parts Treated	Rejected After Heat Treatment	Per Cent Rejection	Half Year July to December Inclusive
1918	75,431	6,669	8.85	
1919	72,287	173	0.24	
1920	103,921	44	0.042	
1921	249,376	35	0.014	
1922	88,312	1	0.0011	

In a written discussion offered by R. B. A. Anderson, allusion was made to the extremely striking fact that aircraft metallurgy involves the use not only of aluminum alloys and their heat treatment, but also chrome-molybdenum, silicon-manganese, chrome-vanadium and other alloy steels. William Nelson, a lieutenant commander in the Navy, alluded to the extent to which the changing over from wood to metal construction emphasizes the metallurgy of metals in aircraft for the future.

Aluminum Steels Case-Hardened With Nitrogen

NITRALIZED steel has received considerable attention in this country since its first introduction from Germany and one of the papers at the session on chromium and nickel alloy steels contained some interesting information on this new class of steel. Under the title "The Physical Properties of Several Chromium-Aluminum and Chromium-Nickel-Aluminum Steels," V. O. Homerberg and I. N. Zavarine, Massachusetts Institute of Technology, Cambridge, Mass., present a study of the physical properties of steels containing aluminum as an alloying element which they contend has received little, if any, consideration in the literature.

The affinity of aluminum for nitrogen in the ammonia case-hardening process has resulted in the manufacture of special alloy steels containing aluminum, together with chromium and nickel. The subjection of these steels to the action of ammonia gas at a comparatively low temperature results in the production of a very hard surface without deformation of the material and without any subsequent heat treatment. The paper gives the results of an investigation of the physical properties of three steels containing aluminum.

In answer to a question on the form in which the aluminum appeared in the steel, Mr. Homerberg replied that it was in solid solution and therefore did not result in brittleness as the case would be if the aluminum were present as an oxide. In nitrating there is the possibility of iron nitrate forming if a piece of this steel is nitrated and then exposed to high temperatures, but this difficulty does not appear when heating up to 1000 deg. Fahr. It is not necessary to quench this steel after nitrating, it being common practice in laboratory work simply to let the piece cool down in the furnace.

Penetration in 90 hr. has been found to be about 0.031 in., but the case is so hard that this depth is not necessary and shorter periods of nitrating resulting in less penetration were recommended.

Heat Treatment of Heavy Cast Steel Masses

A STUDY of the physical properties of large cast steel flywheels leads W. J. Merten of the Westinghouse company, Pittsburgh, to recommend an unusually high and complex heat treatment, and tests (both physical and microscopic) taken from full sized prolongations of the casting. Otherwise poor properties will be found in the central portions of the massive sections. His specification follows:

Heat castings slowly and uniformly under atmospheric condition that will cause minimum scalling to 2012 deg. Fahr. (1100 deg. C.), 1½ hr. per inch of minimum dimension of the heaviest section is approximately the minimum time to reach that temperature. Hold at this temperature for at least 2 hr. per in. of width of cross section.

Cool in furnace with door open to 1600 deg. Fahr., then in air to black heat of 800 deg. Fahr.

Reheat to 1600 deg. Fahr., time of heating to consume about 1 hr. for every inch of width of cross section.

Hold at 1600 deg. Fahr. 1 hr. for every inch of width of cross section. Cool in air to black heat (800 deg. Fahr.).

Reheat to 1275 deg. Fahr. and cool in furnace to 600 deg. Fahr., then in air.

Major R. A. Bull, director of Electric Steel Founders' Research Group, Chicago, believed that if such a

The Campbell Memorial Lecturer and the Late Scientist Thus Honored



DR. ZAY JEFFRIES



PROF. E. D. CAMPBELL

high heat is necessary for the thicker portions of the casting, it would overheat the thinner portions by some 400 deg. Fahr. Mr. Merten said that no trouble from this was encountered. Engineers should avoid such designs; where they were necessary the main thing to control is porosity at the junction.

G. M. Eaton, Molybdenum Corporation of America, Pittsburgh, emphasized that the sole object of testing is to find out whether the steel will do the service required, so it is obvious that test pieces should be cut from the most highly stressed part, rather than from a lug cast wherever the foundryman finds it convenient.

Sections of cast steel from 2 to 17 in. thick have

been studied by the Allis-Chalmers Co. since 1922, and the conclusion, as reported by Mr. Stein, is that a 1650 to 1675 deg. anneal is high enough if a long enough time is given. Hotter temperatures mean more scale and more danger of sagging out of shape. That company is using core drill tests on all important castings, and finds a double heat treatment is necessary to meet the strength and microscopic requirements.

A. W. Lorenz, of the Bucyrus Co., Milwaukee, emphasized that the annealing temperature depends upon the quality of the steel and its original cast structure. If the original structure is poor he would expect to have to anneal at Merten's temperatures, but he found that a good steel casting 6 in. thick would give 28 per cent elongation and 25 Charpy at the center after a 1650 deg. annealing followed by air cooling. Double treatment at 1800 and 1500 deg. would increase the elongation, even up to 40 per cent.

Deep Etching Valuable in Testing

DEEP etching as a means of testing iron and steel is of wide interest and at the first session an important paper on this subject, which describes the types of structure revealed by this method, was presented by H. G. Keshian, metallurgist Chase Companies, Inc., Waterbury, Conn. The various factors influencing the results are discussed by Mr. Keshian, such as the method of melting, chemical composition, reduction of area, heat treatment, the direction of fiber in the steel, etc. The value and the limitations of the method based on the relation of various etch structures to the performance of the steel in service are pointed out as the result of the author's experience.

Mr. Keshian, when presenting the paper in abstract, displayed a large number of macrographs and other illustrations gleaned from his experience. Unsoundness and serious segregations in steel and iron are pointed to as being revealed most successfully by the deep etch test, although it is admitted by the author that the exact nature of the defects in the metal is not always shown up. The fact that their presence is revealed is an important consideration. To secure constant results and to properly interpret them, the strength and temperature of the etching acid and the time of immersion should be standardized according to the author.

It was pointed out after the presentation of the paper that the method is liable to be abused and misinterpreted. Alvin L. Davis testified to the value of deep etching in detecting discontinuity in metals and said that other methods are not as decisive. While fine textures are revealed, the conclusions drawn therefrom may be misleading. Another speaker said that deep etching can serve as a proper guide for the selection of a suitable tool, and V. O. Homerberg pointed out the wide field open to this method, if properly manipulated. If it is used with the care pointed out by the author, its value is unquestioned.

Dilatometric Heat Treatment

DISCUSSING the "Dilatometric Analysis of Steel and Some Results of Dilatometric Heat Treatment," R. W. Woodward and S. P. Rockwell, Hartford, Conn., state that as a result of an extensive study, certain dilatometric curves of sound commercial steels have been obtained and from these certain fundamental dilatometric constants and transformation temperatures have been obtained.

For these dilatometric constants it is proposed to classify steels according to their proper quenching medium, although further study is necessary to set the limits for such a classification.

Heat treatment taking advantage of thermal hysteresis is discussed and a means shown for further increasing hysteresis and securing the benefits of still lower quenching temperatures for certain steels.

How Automobile Body Sheets Are Tested

J. WINLOCK and G. L. Kelley, of Edward G. Budd Mfg. Co., Philadelphia, have studied the deep drawing qualities of automobile sheet. They recognize that the method of applying the stress, the friction between die and sheet, the radius of the fillets at corners,

the pressure between blank-holder and the thickness of the sheet all affect the ability of the sheet to be successfully drawn. Yet a statistical study of the physical properties of test pieces taken from heats of metal working regularly (i. e. when the die is on the press and all or none of the stampings are breaking) indicates that no trouble will appear if the elongation in 2 in. is not less than 37 per cent longitudinally and 34 per cent transversely to rolling, and in 8 in. (measured on the same specimens) is not less than 25 per cent either longitudinally or transversely. Averaged results on three specimens taken at diverse positions in each direction are to be used.

No such consistent results can be discovered when analyzing data on elastic limit, ultimate strength, ratio



THIS year the Henry M. Howe medallist was W. P. Sykes, metallurgist Cleveland Wire Works, Inc and Escent Lamp Division, General Electric Co., Cleveland. It was bestowed in recognition of his paper on the iron-molybdenum system last year. Dr. F. C. Langenburg was the Howe medallist last year

or difference between these two properties, cupping test (either direct or corrected according to Erichsen's curve), microstructure, grain size, hardness, bend test, or chemical analysis. Excessively large grain size is undesirable because it produces a coarse granular surface on deep draws, and is liable to cause extreme brittleness after one or two preliminary drawing operations. Sheets with unusually refined grain, on the other hand, will tend to buckle unless the blank-holder is pressed down more strongly. Spheroidized cementite or striated structures due to cool finishing passes appears to have no influence on successful work when the elongation figures are met.

Alloy Gray Iron Castings

ASSERTING that the constitution and primary structure of cast iron are essentially the same as in steel, except for the amount and form of the contained carbon, D. M. Houston, International Nickel Co., New York, in a paper, "The Economic Value of Nickel and Chromium in Gray Iron Castings" discusses the use of nickel and chromium in foundry mixtures and gives the approximate equivalents to assist in determining the nature of the structure that may be obtained from an alloy mixture, compared with plain iron or semi-steel.

The practical applications of nickel-gray iron are described and four examples are cited, including automobile cylinders, forming dies, jigs and tool fixtures, certain types of Diesel engine liners, etc. Mr. Houston dwells also upon the importance of base composition as an economic factor.

Memorial Lecture—Cause of Hardness in Quenched Steel

DR. ZAY JEFFRIES, consulting metallurgist of Cleveland and nominee for vice-president, delivered the second E. D. Campbell memorial lecture on Wednesday morning, his discourse being a discussion of the nature of martensite, the hardest constituent of steels.

That alloy cast iron die blocks are being used successfully in blanking out ½-in. steel into skate blades was pointed out in a brief discussion. The importance of knowing that the alloy stays in the iron provoked discussion as to whether or not alloys should be added in the cupola or in the ladle.

Prof. A. H. White, long an associate of Professor Campbell at the University of Michigan, acted as chairman.

Complex Carbides Postulated by Campbell

It was fitting that the lecturer should state Professor Campbell's beliefs ("views" would be the wrong term to apply to a blinded man) on the constitution of hardened steels. Quotations from a paper published 13 years ago, long before the advent of X-ray analysis, indicated that Campbell had a clear conception of the way nickel and other metals enter solid solution in the iron by replacing atoms in the regular lattice. He also rejected the beta iron hypothesis of hardening, holding in fact that such modification does not exist. In other respects, Campbell's views do not tally so well with the ones held by leading investigators today, since he believed complex carbides dissolved in iron to be the principal factor in hardening. The view today is that these carbides must dissociate into their atoms before solution can take place.

X-Rays Show Martensite to Be Alpha Iron

There is probably little dissent from the view that austenite is gamma iron containing carbon atoms dispersed through the mass more or less uniformly. On slow cooling austenite changes to alpha iron and iron carbide (Fe_3C). Since the change from gamma to alpha iron is merely an atomic rearrangement and requires no diffusion, Jeffries believes it requires less time than the formation of cementite, and is the first and essential step for the production of martensite. Cementite appears later; it forms and crystallizes simultaneously. This requires diffusion of carbon atoms in the solid, and consequently so much time that a rapid cooling will reduce the temperature some 500 deg. below the normal change point before there is any observable change in the condition of the carbon. In his view, therefore, freshly formed martensite is alpha iron retaining atoms of carbon in the crystal lattice.

The lecturer presented many facts concerning the physical properties of quenched carbon steels after tempering to various temperatures. He also showed well-defined martensitic structures in solid solution alloys, even in those which have no allotropic modifications, and concluded that the needle-like markings are vestiges of changes occurring at the octahedral planes of the pre-existing crystals. New X-ray studies of martensite, made from very coarse grained austenite, showed that many random orientations exist in the tiny ferrite crystals, with a suggestion of preferred directions. This indicates that the gamma to alpha change is accompanied by a real recrystallization at a myriad of nuclei, and crystal growth probably develops platelets arranged along the octahedral planes of the original austenite crystals.

Carbon Acts Principally as Grain Refiner

If martensite is a solution of carbon in alpha iron, why is it so hard? Jeffries advanced two reasons: First, small grain size of the alpha iron, and second, the hardening action of carbon in solid solution. The relative importance of these two factors cannot be evaluated until some coarse grained ferrite with carbon in solid solution can be prepared. As a matter of fact, this may be impossible, for it appears that one of the major influences of the carbon is to make an excessively fine grain in the iron. Intensified hardness of aged martensite is due to subsequent formation of tiny crystals of cementite. Analogies were drawn to a 4 per cent iron-molybdenum alloy which in fine grained solid solution has a Brinell hardness of 215, and upon aging to develop iron molybde the hardness reaches 500. Carbon is not necessary for extreme hardness in iron, for an electric arc produces a glass-hard spot on carbon-free iron. Also briquettes made of fine iron particles, reduced from oxide by hydrogen, have high hardness.

Martensite, then, is fine grained ferrite with carbon in solid solution. The hardness is due to the interference to slip offered by the grain boundaries and by the carbon atoms within the crystals. The function of carbon as a hardener is primarily due to its influence on grain refinement in the ferrite. Early age hardening of martensite is due to the precipitation and

crystallization of iron carbide to the ferrite grain boundaries.

Membership and Finances Expand

SUBSTANTIAL growth in membership, amounting to 16.3 per cent as compared to a year ago; the addition of five new chapters and groups; further increase in the surplus held by the treasurer; and desirable changes in the constitution and by-laws of the society, all give proof of the progressive strides being maintained by the American Society for Steel Treating, as brought out at the annual meeting.

Tribute was paid to the late Judge E. H. Gary, an honorary member of the society, by President J. Fletcher Harper, research engineer Allis-Chalmers Mfg. Co., Milwaukee, whose annual report touched briefly but forcibly on the progress being made by the society and the further advancement for which the present officers are successfully striving. He laid particular emphasis on the extension lecture course which is being sponsored by the society in cooperation with Purdue University.

Membership Approaching 5000

Membership in the society now stands at 4623, this being a net gain of 653 new members or an increase of 16.3 per cent since the reading of the secretary's report in the fall of 1926. Mr. Eisenman pointed with pride to the fact that the Montreal group has been promoted to the standing of a chapter and that the total assets in the treasuries of the chapters is close to \$18,000. His classification of the 12,000 pages in the past 12 issues of the *Transactions* of the society show that 34 per cent of the pages are of a practical character and 21 per cent cover highly technical matters. It is probable, he said, that the exposition next year in Philadelphia will be limited to 75,000 sq. ft., as compared with 93,000 sq. ft. in Detroit, and 87,000 sq. ft. in Chicago in 1926.

Surplus Nearly \$140,000

The present net worth of the society is \$117,702, but with income for the remainder of 1927 added, less expenses, it is predicted by Dr. Zay Jeffries, consulting metallurgist and treasurer of the society, that the total assets as of Dec. 31, 1927, should reach \$140,000. The strength of the society in this respect is shown by the fact that in 1921 assets totalled only \$16,000.

Changes in the Governing Laws

Chairman Harper closed the business meeting, following a vote of acceptance of changes in the constitution and by-laws which were presented by S. F. Havens.

Foremost among the new governing clauses are, that the associate-membership grade will be eliminated; the office of the vice-president will be reduced from two years to one year; if no independent nominations for officers are made, then, those men recommended by the nominating committee shall be made officers of the society without the formality of a ballot by the individual members; the board of directors may, by a two-thirds vote, lease, sell or otherwise dispose of real estate which may come under the ownership of the society; and standing committees may be appointed for three years in such rotation that terms of service will not all expire at one time.

Entertainments and Plant Visits

THE entertainment features during the week were quite elaborate. The arrangements for these, as well as for the various conventions of the exposition, were smoothly and efficiently carried out. One reason for this was the adoption of a new policy by the board of directors which relieves the local chapters of the steel treaters from direct responsibility for the burden of the details. A committee this year, consisting of M. J. Watson and Robert Atkinson, represented the board of directors in making arrangements for the convention in cooperation with the national headquarters, and E. J. Hergenroether and J. G. Gagman, chairman and secretary, respectively, of the Detroit chapter, assisted in this work.

A midnight frolic at the State Theater commencing at 11 p. m. was the first evening's entertainment and it

was participated in by several thousand members and guests. It consisted of the regular vaudeville and motion picture program, supplemented by the brass band of the Ford Motor Co., and several other features. For the first time ladies were present at this function which, in the past, has been a smoker. On the following evening in the appropriately decorated ballroom of the Hotel Statler was held the "grand Arabian ball."

Extensive arrangements for plant visitations were a feature. There were over 20 plants, many of them large automobile companies, which opened their doors. The participation in some cases was so large that attendance at the afternoon's technical session suffered. The program of entertainment for the large registration of ladies was elaborate.

A Poet Presides at the Banquet

EDGAR A. GUEST, Detroit's poet, was the life of the banquet, attended by nearly 500 guests. As toastmaster he was both highly entertaining and clever. It was held in the ballroom of the Hotel Statler and at-

tended by steel treaters, Institute of Metals members, as well as automotive engineers and some of the welding society members.

President Harper made a brief, appropriate address; former president William Bidle, Cleveland, presented the past-presidents' medal to R. M. Bird of Philadelphia; and F. P. Gilligan, also a past-president, made the presentation of the Henry M. Howe medal to S. P. Sykes of Cleveland, which is annually awarded to the author of the best paper on the program at the preceding annual meeting.

President Harper then conferred honorary membership on Dr. W. R. Whitney and Charles F. Kittering, directors, respectively, of the research department of the General Electric Co., Schenectady, and the General Motors Corporation, Detroit.

It was announced by the president that the usual custom of presenting a special memorial or prize in the shape of a bell to the chapter which had made the best showing during the past year resulted in an award to the San Francisco chapter.

Steel Exposition Large and Impressive

NO former exposition of the society has equalled the one last week at Detroit. Both the magnitude and diversity of exhibits were the features, as well as the progress reported visibly in many lines. The floor space actually rented was 93,000 sq. ft. against 87,000 sq. ft. in Chicago last year. The ar-

range, however, surpassed in convenience and in perspective more recent displays. With nearly 300 exhibitors, many of them new ones, it is possible here only to give those who were not present a general review of the exposition as a whole. The show has reached such proportions that detailed reports are not feasible.

THE total area was divided into four large rooms adjoining each other in the form of a square. In the first two were the steel company displays and other miscellaneous ones. In a third were machine and other tools, and in a fourth were welding, electric heat treatment and allied equipment, while adjacent to the latter about 15,000 sq. ft. was devoted to gas.

Nearly half the total space was taken up with displays of steel companies and miscellaneous alloys and heat-treating equipment.

Steel Companies Make Fine Showing

MANY of the large steel companies presented their products and other features on a large scale this year. Large booths, attractively finished, drew the attention of many. Two features in particular stood out from the displays—alloy steels in general and special steels for aircraft.

Prominent in several booths was the progress revealed in the rustless irons and stainless steels. New producers, as well as new compositions and applications, were featured. In rustless iron one American company is offering house grate fronts and furniture, as well as mirrors, automobile trimmings and kitchen equipment.

Several of the alloy steel producers, particularly electric, called attention prominently to the progress, which is astonishingly rapid, in the making of highly specialized alloy steels, carefully heat treated, now being used by airplane engine makers. Alloy steels in general, both electric and open-hearth, whether for automobiles or tool steels, were generously called attention to. Several steel companies had either prize contests or gave away souvenirs of some value.

The special alloy producers, those for heat-treating equipment, were largely represented, some by elaborate

FOR 61 years P. J. McDonough has been producing octagonal and hexagonal bars of punch and chisel steel of accurate size by hammering, the size being regulated to within 0.005 in. by his trained eye and skill. Born 74 years ago in Scotland of Irish parents, he came to this country when less than one year old. At the booth of the Firth Sterling Steel Co. he was a center of interest where he daily made bars of 3/16 to 3/8 in. His regular daily 8-hr. product runs up to 15/16 in. He has been with the Firth company since 1889, when it took over the plant of C. Y. Wheeler. His product was exhibited at the Centennial Exposition in 1876 when he worked for Hussy, Howe & Co. of Pittsburgh.



displays. Several new alloys were called attention to, some for heat-treating equipment and some for bearing metals.

All types of hardness testing equipment were visible. One new automatic one from England, using a diamond point to make a square impression, attracted considerable favorable attention.

In pyrometric and similar apparatus there was a liberal offering, some of it in actual working condition. New types or modifications in existing apparatus were noted.

Several of the abrasives, carborundum and refractory producers were in evidence with new products, new applications or records of past performance.

Heat-Treating Furnaces Numerous

FURNACES for heat treating, both electric and gas, were a prominent feature. Together they must have represented at least 30 per cent of the total space.

Gas as a Fuel Imposingly Shown

In what is known as the North Woodward annex, the American Gas Association brought together many representative gas equipment companies. These offered all types of gas heat-treating and other furnaces in actual working condition and the display as a whole and in detail was an imposing one.

Electric Furnaces Operating

Several large and small makers of electric heat-treating furnaces and equipment were segregated close to the gas display. Many had large and small furnaces in actual working condition and one or two companies called attention to new types of furnaces and to new applications.

Machine Tool Accessories a Feature

OWING to the simultaneous exhibition in Cleveland, production types of machine tools were practically absent. This gave room for a varied display of small machine parts, such as springs, saws, drills, chucks,

dies, stamps and lubricators. Lighter types of machine tools, like saws and nibblers, and a number of precision tools for tool rooms and die making were also there. Heavy operating machinery was confined to forging, heading, piercing, pressing, coping and shearing machines. Some specialties—such as wire drawing machines, eyelet machines, spring coilers—drew much interest.

Centrifugally cast bronze tubes up to 26 in. diameter, 25 ft. long and 6 tons weight were on display. Aside from the beautiful finish and evident soundness of the metal, other advantages of exact concentricity and small finishing allowances are claimed for these tubes when cut into liners, bushings, and bearings of various sorts.

Influenced by the expected audience a number of exhibitors showed automotive parts and assemblies. One most attractive one was a sectionalized Nash chassis. A Stinson fuselage was also seen in the welding section. Others of note were a complete racing car, a Wright whirlwind motor, a Curtis D-12 motor, a Wasp motor, a sectionalized Studebaker body, and a flash-welded Murray body.

Dies, die steel, and die-making machinery were observed in all sections of the show. Many steel companies exhibited their favorite steel made into a die, large or small, and invited you to guess how many pieces it had cut, or would cut, or how much it weighed. All of which impresses the importance of forgings, stampings and pressed articles in mass production.

Innovations in Shop Practices in Welding

Welders showed their wares in one section of the hall. This is the third show sponsored by the American Welding Society; the first was held in the steam laboratory at Massachusetts Institute of Technology; the second in an auditorium in Buffalo. The third exceeded by far the others in variety and number of exhibits.

Little distinctively new welding equipment was to be seen. Numbers of improvements in apparatus de-

Some Interesting High Lights of National Metal Week

AN interesting couple were Mr. and Mrs. F. C. A. H. Lantsberry of Sheffield, England. Mr. Lantsberry is an official of William Jessop & Sons Co., Ltd., and has been in this country on this visit since last May. He presented a paper at the Boston convention of the A. S. S. T. in 1923. His wife is an American, of Binghamton, N. Y.

DECIDED interest was awakened by the advertising scheme of a prominent heat-treating alloy maker. Nunzio Carbone is believed to be the smallest molder in existence—only 35 in. tall and weighing only 65 lb.; this 29-year old man circulated among the exhibitors with a dog much larger than himself. His size also permits him to inspect and grind the interior of retorts as small as 14 in. in diameter.

CLEVER motion pictures of various men and groups were a feature of the midnight frolic at the State Theatre Tuesday evening. They elicited much applause.

DETERMINING carbon in steel by electric resistance by means of a special apparatus was exhibited at one of the hotels by N. K. G. Tholand of New York, representative of certain Swedish steel and other companies. The apparatus, which is known as the Enland and invented by a Swede, created considerable interest among those who were fortunate enough to see it. A description will appear in a later issue of *THE IRON AGE*.

TWO founders of the original society which formed the nucleus of the present organization were present with their wives—T. E. Barker and A. G. Henry of Chicago. Both were officers of the Chicago chapter, over nine years ago, which was the start of the American Steel Treating Society. Mr. Barker has just been deservedly made a director for two years.

IT is not often that two feminine metallurgists of prominence mingle and "hold their own" among so many of the opposite sex. Miss Constance Elam, of London, a metallurgist who has made a name for herself on both sides of the Atlantic, was a visitor at the technical sessions and at the exposition. Miss Frances Hurd Clark, metallographist for the Western Union Telegraph Co. of New York, presided at one of the technical sessions. She is a member of the New York chapter and is one of the two women members of the society, the other being Edith Chartkoff, of Cleveland, associated in work with Doctor Jeffries and W. P. Sykes.

ONE metallurgist from Czechoslovakia was noted in the person of B. K. Kamenicky, a mechanical engineer from the Skoda Works at Pilsen.

APROMINENT German visitor was Richard Bauer of Bochum, Germany. He is a member of the Verein Deutscher Ingenieure and the Verein Deutscher Eisenhuettenleute.

ABRITISH steel man and metallurgist from Sheffield, England, G. Batty, who has had evidently a wide experience in making steel, particularly basic electric for steel castings. He made some impressive comment at the steel melting session of the A. S. S. T. He was frequently in the company of J. Kent Smith, another well known British metallurgist who is now located at Detroit. Mr. Smith spent most of his time at the booth of a company for which he does consulting work.

THE secretaries of the American Foundrymen's Association and of the American Institute of Mining and Metallurgical Engineers, C. E. Hoyt and Dr. H. Foster Bain, respectively, were interested guests. Mr. Hoyt was noticed carefully inspecting all phases of the exposition.

THE president of the American Foundrymen's Association, S. W. Utley, was a guest at the head table at the banquet and was active in circulating among the exhibitors at the exposition. He is vice-president and general manager Detroit Steel Castings Co.

AT least six prominent members of the A. S. S. T. (and other technical societies) were absent because they are in Europe. The list includes A. E. White, T. D. Lynch, both past presidents; Charles McKnight, F. F. Lucas, Marcus Grossman and E. C. Bain. The weight of their opinion in discussions was missed.

tails would be indicated by exhibitors, but not much else. The advances being made by the welding industry are apparently in the nature of innovations in shop practices, matters which do not lend themselves well to exhibition purposes—or at least the exhibition technique is yet to be developed.

One important exception to the above statement is a new oxy-acetylene welder for longitudinal seams in sheet metal. The machine has all the outward appearances of a perfected design, being adequately equipped with automatic controls, speed regulation and safety devices. While the machine on display is primarily for making barrels, it appears readily adaptable to flat or curved sheets for a wide variety of purposes.

A double-arc electric welder for joining $\frac{1}{2}$ -in. steel plate was also in operation. Special fluxed electrodes are used. As made, the plates were sawed into test strips, and tested immediately in tension or in bend-

ing. An average ultimate tensile strength of 50,000 lb. per sq. in., and a 90 deg. bend were reported.

Resistance welders were exhibited in great variety—those for making butt welds between bars, flash welds between sheets, spot welds and seam welds between overlapping pieces. Automatic control of pressure, length of time the current is on, and speed of advance in the seam are features contained on the most advanced machines. They also appear to be readily adjustable to a considerable range of performance.

The soundness of weld metal and the thorough penetration into both sides of the joint was strikingly exhibited in two massive parts (one a blooming mill roll neck and the other a Diesel engine crank shaft), which had been repaired and then a considerable portion of the joint and adjoining metal cut away by a planer. No trace of the transition between original and filler metal could be found, nor was there a blow hole or sign of porosity.

Making Up Sub-Assemblies Ahead of Orders

Control of Stock Facilitated—Handling Equipment Similar to That for Core Ovens—Other Methods of Control

IN times of dull business a machine tool manufacturer in Ohio finds it convenient to make up certain standard types of turret lathes in lots of 25, and in advance of specific orders. This not only keeps the best men busy, maintains the force intact and helps morale, but at the same time it places the company in a position to fill orders almost over night for these standard machines.

In making up these batches, in which a number of sub-assemblies are performed, a somewhat unusual method of taking materials out of stock is employed. For a given sub-assembly, for instance, every piece, every bolt, nut, washer, screw or what not, which is going to be required is selected from the stockroom, multiplied by 25 for the total number to be made and then the entire number of individual parts checked. As a result of this practice, when the work progresses in the shop there are no shortages of needed bolts, nor of anything else, and there are no overages. The work proceeds with the full knowledge that exactly what is wanted, and no more, will be found on the trays on which this material reaches the assembly line.

Steel angles and plates form the multiple trays, much after the pattern of those used in a core room. They measure about 5 ft. high and about 3 ft. x 4 ft. in plan. There are four or five of the plate platforms, so to speak, the lowest being about 1 ft. off the floor. These trays, after being filled and checked in the stockroom, are brought into the assembly room on electric lift trucks and deposited in a convenient position. Four or five such trays may be required to cover the necessities of a 25-unit lot of sub-assembly. Whatever the number, however, the entire quota of

pieces reaches the assembly line before work is started.

Removing from stock all the bolts and other material necessary for 25 assemblies at one time, instead of taking them out a few at a time, makes apparent the extent of depletion of each stock bin. In this manner it assists in giving warning that further orders for the stock bins must be placed to keep them up to the required extent. The system has proved of advantage in this respect and has anticipated depletion of stock in a number of instances.

In another plant, where stock was handled in a somewhat similar manner, this question of depletion of bins was taken care of differently. Each item was stored in two bins. Withdrawals were made from one bin only, until that bin became empty. As soon as this condition was reached an order was entered, as a matter of course, for a quantity of that material sufficient to fill the empty bin. While this order was being executed the other bin was being drawn upon.

Still a third method of raising the danger signal was that adopted in another plant. Here a board or tray was placed in each bin as a physical separation between the material above it, which was drawn from freely upon requisition, and a definite amount of material below the sub-dividing board. This amount, which varied with the character of the material, was that which experience had shown would be the full requirements of the plant during the period of time necessary to procure delivery of an order for more of the material. Thus an order placed immediately when the dividing board was reached could be expected to arrive at the bin before the last of the supply should have been called for.

National Uniformity in Bolt and Nut Sizes

Tables of standard sizes for square and hexagonal bolt heads and nuts and for the corresponding wrench openings were recently approved by the American Engineering Standards Committee as a tentative American standard. The tables were established with much effort and care by a sectional committee appointed under the procedure of the A. E. S. C. by the organizations sponsoring this work, viz., the Society of Automotive Engineers and the American Society of Mechanical Engineers.

The sectional committee, under the chairmanship of Prof. Arthur E. Norton, Harvard University, is subdivided into several committees, each dealing with a special subject. Subcommittee 2 (chairman, Commander T. C. Kinkaid, U. S. N.) worked out the tables. These deal with rough, semi-finished and finished square

and hexagonal bolt heads and regular nuts, finished hexagonal cap screw heads, set screw heads, finished and semi-finished hexagonal jam nuts, hexagonal light nuts, hexagonal and square machine screw nuts, and stove bolt nuts, hexagonal castellated nuts, and wrench openings.

The new standard is meant to introduce national uniformity. The sizes of bolt heads and nuts are intended to supersede all existing standards, which have grown up from commercial standard bolt heads and nuts. The dimensions listed are in accord with the tendencies of recent years toward smaller sizes for bolt heads and nuts than were given by the "U. S. Standard," thus called because it was established by the Navy Department in 1868.

Copies of the standard may be obtained at 35 cents a copy from the American Engineering Standards Committee, or the sponsor bodies, all located at 29 West Thirty-ninth Street, New York.

New Designs at Machine Tool Show

Satisfaction Expressed Both by Exhibitors and Visitors to
Cleveland Exposition—Machine Tool Congress Holds
First Meeting

LOOKED at from every ordinary point of view, including the satisfaction expressed both by visitors and exhibitors, the first exposition held by the National Machine Tool Builders' Association in the West Annex and Arcade of the Public Auditorium, Cleveland, Sept. 19-23, must be reported as a success.

From the visitor's viewpoint, not only the large number of machines but the diversity of shop equipment displayed by the 180 exhibitors was impressive. There were many new designs not previously known to users, as well as a large number of recently improved machines—all of which aggregation provided an unusual educational opportunity. The number of machines demonstrated was in excess of 480, which figure takes no account of portable electric and pneumatic equipment and motors, nor the large display of small tools, gages, ball and roller bearings, etc. The size of some of the machines, one of which weighed 50 tons, and two others, 40 tons, was also noteworthy. All of the 480 or more machines were demonstrated in actual operation, and the power requirements totaled large. The exposition was wired to supply 3000 hp. in alternating current and 1500 hp. in direct current. It is estimated that 3000 hp. was in use at all times.

The net floor space occupied by the exhibits was approximately 74,000 sq. ft., made up of 67,000 sq. ft. in the West Annex and 7000 sq. ft. in the arcade of the Auditorium. The gross floor space covered by the exposition was approximately 104,780 sq. ft.

From the exhibitor's point of view, the size and character of the attendance was gratifying. During the mornings and afternoons it was in excess of 8000, to which should be added 2600 to cover the exhibitors and their staffs, who are also buyers of machine tools, and 600 machinery dealers. In addition, there was one evening session, Wednesday, Sept. 21, which attracted an attendance estimated at 6000 from metal working plants in Cleveland and vicinity, which makes the total attendance approximately 17,200. There was no effort to attract the general public, and the registration was made up almost entirely of buyers of machine tools and accessory shop equipment. Orders for machine tools were placed during the exposition, and it is reported that a gratifying amount of prospective business developed.

A survey of the registration of the first four days showed that there were visitors from 42 States and 17 foreign countries. Of those from the United States, there was naturally a preponderance of residents of Ohio and adjacent States, as an accompanying tabulation will indicate, and, of course, many companies sent more than one representative. Registration arrangements provided for securing the visitor's business or professional connection, and a second tabulation has been attempted here to show something of the attendance from different general classes of machine tool users.

Averages obtained from this survey show that

OF EVERY 1000 VISITORS

- 480 were makers of various metal products.
- 78 were in automotive or automotive accessory businesses.
- 55 were with companies producing iron, steel and other metals.
- 50 were builders of electrical machinery.
- 27 were railroad representatives.
- 25 were foreigners.
- 15 were identified with educational institutions, and
- 270 were members of industrial companies not classified definitely in metal working lines; (yet possibly as much as 80 per cent of this group could be put into the "metal products" class).

GEOGRAPHICALLY, OF EVERY 1000 VISITORS

- 526 came from Ohio.
- 114 came from Pennsylvania.
- 79 came from New York.
- 66 came from Michigan.
- 49 came from Illinois.
- 30 came from Indiana.
- 24 came from Wisconsin.
- 16 came from New Jersey.
- 16 came from Connecticut.
- 14 came from Massachusetts.
- 11 came from Missouri.
- 6 came from Iowa.
- 4 each came from West Virginia, Rhode Island, Maryland, Virginia and Minnesota.
- 3 each came from Kansas, Kentucky and Texas.
- 2 each from Georgia, Alabama and California.
- 19 other States averaged less than 1 per 1000.

Of the foreign visitors, among 130 were 80 Canadians, 21 Germans and 9 Englishmen. Others came from Russia, Roumania, Poland, Switzerland, Holland, Hungary, Belgium, Scotland, Cuba, Mexico, Japan and Australia.

Unnoticed by visitors perhaps, but obvious to those who have cooperated in similar activities, was the smooth working of the exposition as a whole. Good management was in evidence everywhere, from the arrangement of the various displays, wide aisle space, the ample registration facilities and the preparation of the official directory, down to such details as the constant and unobtrusive sweeping of floors. This smooth running of the internal mechanism reflected careful planning and a vast amount of detail work done well in advance of the opening day.

Plans for the next exposition will be discussed by the executive committee of the National Machine Tool Builders' Association at a meeting to be held in the near future (Lenox, Mass., Oct. 11).

Some of the new equipment not previously described in *THE IRON AGE* is listed briefly below. The proceedings and personnel of the Machine Tool Congress, the first meeting of which was held at the Hotel Cleveland, during the week of the Machine Tool Builders' Exposition, is also included in the subjoined report.

Tendency Toward Heavier and More Compact Designs

MACHINE tools exhibited included late models of all classes and types, and completely new designs were to be seen, amounting in some cases to innovations. In addition to actual production or other possibilities of the latest designs, visitors had a rare opportunity to observe general trends in designing progress.

Tendency toward compactness, minimizing floor space requirements, and more symmetrical lines were to be noted. Machines are for the most part heavier, more massive, and more powerful. Alloy steel gearing, heat treated, and in some cases ground, is being extensively used. Motor drives built integrally with the machine tools and mounted to minimize vibration and to blend with the design were much in evidence, and variable-speed motors which permit of speed changes without speed transmissions of the geared type are being used on some tools. In some cases the motors are built directly on the spindles, and on other tools several motors are applied to one machine.

Generous bearing surfaces and lubrication and protection of bearings against dust and gritty material was to be observed. Ball and roller bearings are being more extensively employed, not only on intermediate shafts but to the main spindles of some machines. Because of the higher speeds and bearing pressures, adequate lubrication of bearings is a particular center of attention. Automatic flood lubrication by

pump or splash is commonly used, the oil being filtered in many cases before being recirculated. Automatic control of the flow of coolant is also a feature of some machines.

Centralized control and the simplification both of the number and location of controls, as well as the use of push-button electrical control, are other fundamental developments. Ease of chucking, the use of pneumatic and automatic mechanically-operated chucks and treadle control of the workheads on grinders, are other features facilitating operation. Increased simplification of speeds and feeds makes it easier for the operator to make changes and thereby encourages the use of the most suitable speeds and feeds for the work in hand.

One tendency attracting much attention was the wider utilization of hydraulic feeds. One new milling machine, several drilling machines and several grinding machines, as well as broaches and honing machines employ this feature. An innovation in the press field was a new hydraulically-operated stamping press.

Some of the new machine tools not previously described in THE IRON AGE are as follows:

Several New Grinding Machines Exhibited

The Bridgeport Safety Emery Wheel Co., Bridgeport, Conn., showed its new type 94 heavy-duty face grinder, equipped with a 42-in. sectional grinding wheel and hydraulic table drive, providing an infinite table feed range. In addition to an oil drive type face grinding machine, the Diamond Machine Co., Providence, R. I., exhibited an automatic surface grinding machine of the oil drive type. Features include a universal grinding head (also furnished with a plain grinding head), oil table drive and electric cross and elevating feeds. One of the exhibits at the Abrasive Machine Tool Co., Providence, R. I., was a new No. 5 surface grinder, features of which include unit system of construction, centralized control, and the use of ball bearings on all high speed shafts.

Four new machines were shown by Charles H. Besly & Co., Chicago. These included a No. 6, 20-in. dry belt-driven disk grinder; a No. 161 30-in. direct-connected motor-driven dry disk grinder, and the No. 49, 53-in. direct-connected, motor-driven vertical spindle dry disk grinder. The company's No. 309, 30-in. vertical spindle motor-driven grinder was also shown. Details of these machines will be given in a forthcoming issue of THE IRON AGE.

A new Osterholm face grinding machine for high-speed production operations was a new machine of Williams, White & Co., Moline, Ill. The work is held by simple jigs or fixtures and is tilted against the grinding wheel. Except for loading and unloading, the cycle of operation is entirely automatic. Surfaces up to 10 in. wide by 36 in. long can be ground. A new high-speed grinding machine with wheels running at approximately 10,000 ft. per min. was demonstrated by the Ransom Mfg. Co., Oshkosh, Wis. The spindles are large, are mounted on ball bearings, and a special type of oil filter is employed for the bearings, to guard against abrasive. An adjustable and removable rest and rest bracket are provided to facilitate apron grinding. The wheel guards provided have a removable hopper at the front to permit the workmen to stand close to the wheels.

Milling Machine With Hydraulic Table Drive

New automatic milling machines brought out by the Cincinnati Milling Machine Co., Cincinnati, were a center of interest. These machines incorporate hydraulically-operated table movement, automatically controlled. The company's system of locked hydraulic feed is employed and power quick traverse of 300 in. per min. is provided. There is automatic variation of feed rate during the cut, intermittent feed, automatic lubrication for the feed mechanism, and instantaneous direct feed changes. Tapered roller bearings are employed from the pulley to the cutter and the spindle drive is lubricated automatically. Spindle reverse as well as automatic spindle stop is provided. The bed is of new design and special provision is made to handle chip accumulation, and to facilitate chip removal. One position operating control is another feature. Further details on this machine will be given in a forthcoming issue of THE IRON AGE.

A heavy-pattern, Ingersoll type milling machine, weighing 100,000 lb., was among the exhibits of the Ingersoll Milling Machine Co., Rockford, Ill. The machine is a 60 x 48-in. x 14-ft. unit. The different movements of the four heads were demonstrated in the cutting of large blocks of steel. The Reed-Prentice Corporation, Worcester, Mass., exhibited a new die sinking and vertical milling machine, designated as the No. 5. The table working service is 16 x 62 in. and rapid power traverse to the cross and longitudinal feed, the rate in either direction being 100 in. per min. A fully automatic thread milling machine with hopper feed was exhibited by the Hall Planetary Co., Philadelphia. The

machine shown was set up for automobile hub nuts, but is adapted for different types of quantity threading and for finishing work.

Large Exhibits of Drilling and Tapping Equipment

Several new and improved designs of drilling and tapping equipment were to be seen. Among other new machines, the Cincinnati Bickford Tool Co., Cincinnati, exhibited a 21-in. upright drill of the cone type. Features include automatic lubrication, tapered rolling bearings, complete inclosure of all mechanism, and a head of new design, incorporating quick advance and return clutch.

The W. F. & John Barnes Co., Rockford, Ill., exhibited a new No. 820 drilling machine of 1½-in. capacity. Six feeds and three feeds are provided, and the table is of elevating and swinging type. Tapered roller bearings are employed. When equipped with motor, Texrope drive is used. The Barnes Drill Co., Rockford, Ill., showed a new No. 240, single spindle production drilling machine with hydraulic feed. It has automatic rapid approach, feeds at any predetermined rate per setting of the control index lever, and quick spindle return. Another feature is the use of a 7½-hp. flanged motor, mounted inside of the machine. A pressure gage on the hydraulic pipe line is intended to aid the operator in determining when the cutting tool has become dull.

A box-column type heavy-duty driller designated as the No. 5-7½-hp., and designed for the application of multiple-spindle auxiliary heads, was a new unit exhibited by the Hofer Mfg. Co., Freeport, Ill. There is an automatically feeding table which functions independently of the spindle, but not simultaneously. The table cycle is arranged for rapid approach, feed, rapid return and index of the table, the cycle being then repeated. The table may be equipped with a quick acting fixture, and can be furnished with cam, hydraulic or screw feed for the table. Roller bearings are used throughout. Another machine shown by this company was a No. 3 Driller, equipped with a large rotating table and four multiple-spindle auxiliary head units.

In addition to other new machines, the Foote-Purt Co., Cleveland, had in operation a single-spindle automatic nut tapping machine for nuts from ¾ to 1¼ in. Except for the hopper feed, the general arrangement is the same as the company's automatic tapping machine for use on pipe couplings, etc. On ¾-in. U. S. S. nuts, production is at the rate of 1800 per hr. The Kingsbury Machine Co., Keene, N. H., brought out a new No. 19 drill head with built-in motor, and of ½-¾-in. capacity. A new No. 109 burring spindle unit, vertical type, with automatic clamping fixtures, and of ¼-in. capacity was also in operation as well as a dial-feed type machine for drilling, countersinking and burring cap screws in one pass through the machine.

Among the drilling and tapping machinery at the booth of the Charles G. Allen Co., Barre, Mass., was a two-spindle unit equipped with combination of cam and power feed, one spindle being arranged for deep hole drilling, the other tapping with the cam feed, which gives quick return. This feature is combined with the standard power feed.

Demco-Bradford automatic unit-type drilling and tapping heads were among the exhibits of the Bradford Machine Tool Co. of Cincinnati. These heads are self-contained, are equipped with ball-bearings throughout, and are arranged for rapid approach and return of the spindle. Texrope drive motor-in-the-base polishing and buffing lathes were new machines shown by the Cisco Machine Tool Co., Cincinnati. Another new machine was an automatic tapping unit of floor type with capacity up to ½-in. steel.

An automatic forming and threading machine for cap screws and bolts from 5/16 to ¾ in. in diameter, 1 to 6 in. in length, was the center of interest at the booth of the Landis Machine Co., Waynesboro, Pa. The machine is arranged to cut the screw to length, form the point, and thread the blank. Operation is fully automatic, screws and bolts being hopper fed. The machine is motor driven. Production is from 5000 to 15,000 bolts per 8 hr., formed and threaded.

Automatic Lathes of New Design

An automatic vertical turret lathe of completely new design, shown by the Bullard Machine Tool Co., Bridgeport, Conn., was a center of interest. This machine is a single-spindle unit with an indexing monitor type turret for boring, turning, facing and similar operations. A description of this machine appears elsewhere in this issue.

An automatic lathe with a swing over the carriage of 15 in., a swing over the facing slide of 12 in. and over the bed of 16½ in. was among the new machines shown by the Monarch Machine Tool Co., Sidney, Ohio. A 20-in. lathe equipped with ball-bearings, and another of the same size with tapered roller bearings were other new machines demonstrated.

The Cleveland Automatic Machine Co., Cleveland, exhibited a new five-spindle automatic screw machine for tapping, threading and drilling, the machine being of high-speed type for rapid production work. The company also showed a new attachment for four-spindle automatic ma-

chine for generating threads and worms. A new 28-in. type 3H Libby turret lathe was shown by the International Machine Tool Co., Indianapolis. The machine is arranged for motor-drive, and is provided with automatic lubrication even to the aprons. There is a total of 63 ball bearings used. The weight of the machine is 21,000 lb.

The Sundstrand Machine Tool Co., Rockford, Ill., had in operation a new automatic lathe, intended for a wide range of work. Rigidity to facilitate the machining at maximum feed and speed is a feature. The headstock and bed are designed as an integral unit. The main drive is designed to allow complete inclosure of the motor. The spindle is unusually large and is mounted in adjustable taper bearings both front and rear. Speeds are obtained through cams and any speed within the range of the machine can be obtained with one set of cams. The machine is built on the unit principle. A third or vertical tool is obtainable, the drive for which is incorporated into the standard machine.

Greenlee Brothers & Co., Rockford, Ill., exhibited a new 1½ x 6 in. automatic screw machine. The tool slide of this machine is operated through rack and intermittent gearing reducing the set-up time through the elimination of the cam changes. All cross slides are operated by individual cams permitting of independent feeds for each. Other features include the anti-friction bearings and automatic lubrication. The spindles are mounted in tapered roller bearings.

The Putnam Machine Co., Fitchburg, Mass., exhibited a new table-type 5-in. boring, drilling and milling machine. Features include the use of tapered roller bearings, force feed lubrication, heat treated steel gearings and centralized control. The weight is 80,000 lb. A high-power precision horizontal boring and drilling machine designated as the No. 45 was one of the new units featured by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. The machine has a 5-in. spindle and measures 9 ft. between the spindle nose and the outboard support. It has a 16-ft. table which does not override. The bed is 32 ft. long. Hydraulic clamp for the table, herringbone bull gear drive and forced feed lubrication are other features. The weight is 80,000 lb. A Newton tool room planer-type milling ma-

chine for die work was shown by the Consolidated Machine Tool Corporation of America, Rochester, N. Y. Features include full electrical drive, speed and feed boxes being eliminated, a variable-speed motor being employed.

New Gear Finishing and Testing Equipment

The Lees-Bradner Co., Cleveland, had in operation a new gear finishing machine which was offered as a new method of finishing the teeth of spur gears and as differing from rolling or burnishing operations. It is said to correct errors in the contour and spacing of the teeth, at the same time producing a smooth surface. The maximum face of gears that can be handled is 1½ in., the maximum diameter 8 in. and the maximum pitch 3 D P.

One of the interesting new developments shown by the Fellows Gear Shaper Co., Springfield, Vt., was an automatic gear inspection machine designated as the Red Liner, the name being derived from the fact that it records errors in gears by a pen which places a red line on a constantly moving chart. The deviation of the charted line from the datum line represents errors that have been magnified 200 times. The machine records errors, such as eccentricity, tooth-to-tooth spacing, and tooth shape, in combination but in such a way that these errors can be separated and the amount of each definitely determined.

A new machine of the Gleason Works, Rochester, was a manufacturing spiral bevel gear manufacturing generator. The same basic principle of generating is used as in previous Gleason machines. The generating motion is obtained by means of a crown gear and segment, and due to the few parts, the machine is simple and unusually accurate.

William Sellers & Co., Inc., Philadelphia, demonstrated a new 36-in. planer designated as the type K. The Smith & Mills Co., Cincinnati, had a new 32-in. back-gear crank shaper in operation; and a combination punching and shearing machine of new design was shown by the Cleveland Punch and Shear Works Co., Cleveland. A combination shear punch and coper was a new item exhibited by Joseph T. Ryerson & Son, Inc., Chicago. The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, demonstrated a hydraulic stamping press of new design, features of which will be described in a forthcoming issue of THE IRON AGE.

Machine Tool Congress Holds First Meeting

THE Machine Tool Congress, "the purpose of which is to provide a neutral forum wherein users, distributors and producers of machine tools may freely discuss all questions of mutual interest concerning the design and utilization of such machines," held its first meeting in the ballroom of the Hotel Cleveland, Sept. 21, during the week of the Machine Tool Builders Exposition. The chairman of the meeting was Henry D. Sharpe, president of the Brown & Sharpe Mfg. Co., Providence, R. I.

Officers of the conference are: President, C. R. Burt, vice-president and general manager of the Pratt & Whitney Co., Hartford; vice-president, R. A. DeVlieg, Chrysler Motors, Detroit; secretary, E. F. Du Brul, general manager of the National Machine Tool Builders Association; and treasurer, Thomas Jones, Cincinnati Milling Machine Co., Cincinnati.

Directors of the congress are: For three-year terms, A. L. Stewart, Gleason Works, Rochester, N. Y.; K. H. Condit, editor of the *American Machinist*; and J. L. Cochran, National Cash Register Co., Dayton, Ohio. For two-year terms: T. Berna, Union Twist Drill Co., Athol, Mass.; Erik Oberg, editor of *Machinery*, New York; and C. R. Burt of the Pratt & Whitney Co. For one-year terms: Guy Hubbard, American Society of Mechanical Engineers, New York; Thomas Jones, Cincinnati Milling Machine Co., and R. A. DeVlieg, Chrysler Motors, Detroit. The first session was devoted to brief talks on standardization in the machine tool industry, four papers of unusually high caliber being presented.

A résumé of the objectives and advantages of the industrial standardization movement were outlined in an address by Dr. P. G. Agnew, secretary of the American Engineering Standards Committee, New York. This was followed by a brief paper on the "Standardization in the Machine Tool Industry as Seen by Users," by D. L. Rigdon, Westinghouse Electric & Mfg. Co., East Pittsburgh. The third paper, by James E. Gleason, president of the Gleason Works, Rochester, and president of the National Machine Tool Builders Association, was on the "Possibilities of Standardization as Seen by Machine Tool Builders." "Advantages of

Standardization from the Engineering Standpoint" were comprehensively presented by Sol A. Einstein, chief engineer of the Cincinnati Milling Machine Co., Cincinnati. General discussion followed the presentation of these papers.

The second section of the session of the meeting was held on the evening of Sept. 22, with E. P. Blanchard, advertising and assistant sales manager of the Bullard Machine Tool Co., Bridgeport, Conn., presiding. This session took the form of a round table discussion of a number of standardization projects. Discussion of the standardization of initial speeds of machine tools was led by W. L. Miller, Gisholt Machine Co., Madison, Wis., and the standardization of belt pull by A. L. Stewart, Gleason Works, Rochester. Discussion of "The Urging of Standardization of Certain Fundamental Dimensions of Motors, Pumps and Other Purchased Units for Machine Tools," led by Sol A. Einstein of the Cincinnati Milling Machine Co., centered largely on electrical motors and control apparatus. Another topic discussed was the standardization of spindle ends on engine lathes, screw machines and grinding machines, this to include faceplates and chucks.

Further reference to the proceedings of this meeting will be made in THE IRON AGE of Oct. 6.

The Quad-City Foundrymen's Association opened its fall season Sept. 26 at a meeting in the LeClaire Hotel, Moline Ill., at which Benjamin D. Fuller, Cleveland, now associated with Whitehead Brothers, spoke on "Foundry, Past and Present." He is a past president of the American Foundrymen's Association and general chairman of the joint committee on molding sand research.

The fourth annual Pacific Coast Safety Conference will be held at the Hotel Biltmore, Los Angeles, Oct. 24 to 28. Cooperating organizations are the Southern California Society of Safety Engineers, the Society of Safety Engineers of California, the National Safety Council, the United States Bureau of Mines, and the California Industrial Accident Commission.

Science Needed in Selling

Escape from "Profitless Prosperity" Can Be Found Only Through
Careful Study of Marketing and Cooperation with
Competitors to Prevent Unfair Practices

BY E. ST. ELMO LEWIS*

ONE of your sales managers in writing to me referred to "This present era of profitless prosperity"—which is a clever phrasing of a condition which is puzzling many economists and students of business affairs. "We are very busy but we are not getting anywhere—profitwise."

Let us think on this—but let us look inside as well as outside to find some remedies for this condition.

In all departments of a business, scientific methods of control are developing. It is accepted in production. It is accepted in the accounting and finance departments. The engineer in the former and the accountant in the latter are familiar authorities. But in the sales department—well, that is different.

The engineer can have his laboratory, consulting engineers, his staff of experts; the accounting department has its auditors, inside and out, its consultants, and that is all a matter of course.

But the sales manager is "not on his job" who requires, or even hints at the value of, a market analyst, a consultant in sales technique, advertising or merchandising problems. He must know all about markets—may be with 20,000 outlets and 15,000,000 families. The most complex market in the world—the sales manager must know all about automatically.

Henry Morgenthau once said:

Buying, making and selling are really scientific operations which demand the interchange of knowledge as among scientists and there should be available to each man the sum of this knowledge.

Buying—yes; making—yes; but probably not more than 1 per cent of you will agree about selling. Better look into it! It is here.

A Survey of Problems in the Concrete Steel Industry

As you probably know, I have had an opportunity to make a survey of the structural steel situation. The same fundamentals that apply to them apply to you.

I am told by several of your members:

- (1) That you are a service organization.
- (2) That in many cases you do not manufacture your steel, but you purchase from the mills and then fabricate in your own plants.
- (3) That you act in an engineering and advisory way in designing and detailing reinforced concrete structures for your customers.

Your present pressing problems are:

- (1) Competition of the mills.
- (2) Price cutting among yourselves.

These are recognized—and are primarily due to over-capacity, or under-consumption. It is very important what you call it.

There are other problems out of which, I am confident, some of your troubles arise:

- (1) The inter-competitive difficulties of industries.
- (2) The failure to recognize in time the drift of demand, and to prepare to control it by cooperative effort.
- (3) The failure to study intensively the possible market as well as the market in hand.
- (4) The failure cooperatively to get at your real costs so as to be able to make intelligent comparisons, thus enabling your industry to control intelligent competition.

In these things you are not alone.

Many other organizations and industries have similar problems. Having been in contact with some of them, let me make a few comments.

*Counsellor in trade and consumer relations. Abstract of address before Concrete Reinforcing Steel Institute at Detroit, Sept. 19.

Knowledge of Costs Will Prevent Price Cutting

You are growling about price cutting. I think you should forget that attitude. Price cutting may be the first evidence of efficiency. You would never have had cheap automobiles if it had not been for the price cutting of Ford.

Price cutting is defensible no matter how uncomfortable under some conditions.

It is defensible—

- (1) To hold old customers, when they need your help.
- (2) To carry overhead.
- (3) To keep a plant.
- (4) To keep newcomers out of your field.
- (5) To eliminate unfair, incompetent and weak competitors who have become a menace to the industry.

But a lack of cost information is generally the cause of general price cutting.

Several years before he died I heard George W. Perkins say—"Some day the law will stop trying to make business men lose money. The law will compel business men to make money."

Think that over! That is not so foolish as it sounds. You may think about what it would mean to you gentlemen, if the law compelled each of you to make money on every order you book—refused you permission to take an order if you couldn't make a profit on it. It would mean that new plants would be more scarce—efficiency would be higher. After all, isn't that what your association is really dedicated to?

Importance of a Standardized Cost System

Your institute cost work should go further than merely an exchange of cost figures. This exchange, however, is a good start.

In the first place a cost system is not an automatic standardized process. Cost methods vary—and lead to various results. The cost of selling is not the same in all plants because it does not include the same things in all cases—even if all costs of items were the same.

You cannot compare costs until you have standardized costs—thus getting a common denominator.

Competent cost accountants can soon give you the analysis of factors on which practical comparisons can be made. Comparisons should be made of overheads, broken down into units—sales, engineering, estimating, etc. My own experience is that many illuminating facts are buried in overhead items.

Bonus for Sales Volume Encourages Price Cutting

The volume bonus always has a strong tendency to make the salesman a price cutter—it makes him a ready and generous promiser—an any-old-terms giver—and is always demoralizing. I suggest that you work out your bonus on a basis of profit—where the salesman loses every time you lose.

Probably you can work out a combination volume-profit bonus—where you place the bonus on profit and volume, but as the profit declines the bonus rate declines on both volume and profit. This volume-profit bonus method has been used in a number of instances under my observation. In one case, where salesmen were working on point-quotas fixed on gross volume of sales, points were deducted in proportion as the price was cut from standard, and commission was cut in the same proportion. If the cut was 20 per cent, then the salesman got only 80 per cent of the points on the amount; in other words, 80 per cent of 80 per cent,

or 64 per cent of the points on quota rating. The salesman got 80 per cent of the regular commission on the amount of the sale.

Relationship of Jobber to Mill

You have three sales conditions—competitive:

- (1) The rolling mill after large tonnage taking direct sales from you.
- (2) The inter-industry competition—steel vs. concrete.
- (3) The competitive conditions between distributors.

One sales policy is to take the tonnage jobs if you can get them, at rolling mill margins of \$1 to \$3 per ton gross. That always means a loss to the jobber if proper sales costs are figured. If they want this tonnage direct, then you as jobbers should have an understanding with the mills as to what they will handle, and what you will handle. The mills should make their jobbing connections and stick to them, and *vice versa*. Neither you, nor they, can be hounds one time and hares another.

I recommend that the institute make a careful analysis of the total large tonnage orders of the past two years, handled by mills and through jobbers, with costs of handling, selling, etc., and see where it gets you. This will require exchange of information as to overheads that you may not exchange at present.

After you make this analysis then decide if the business is profitable. Then call in the mills and together decide on a policy that will cover the situation.

This situation clearly indicates a work that the institute can do and that should be of great benefit to every member, because it should work out in a way to eliminate an abuse which is causing loss to all concerned.

How to Develop Markets

You may find that you can develop markets—finding new markets—new uses. Now I hear you say—

"We can't afford to spend the money." Then I suggest you get ready to do so—when you can afford it.

Get more facts about your markets—and develop cooperative research into new uses—look into the possibility of consumption. Your cement industry has done a wonderful job of market analysis in some respects. *But have you, as jobbers, found ways to take full advantage of that propaganda?* Market study will show you. If carefully made, I am sure it would develop sales policies that would give greater control of marketing expenses.

Just remember several fundamental things. Selling is a process of getting people to think about our product as we want them to think. It isn't a job for a hunch player or a clairvoyant.

Several years ago these sales fallacies were formulated. I want to stress them. It might be well to put them above your desk—as a constant reminder.

1—It is a fallacy that the public will automatically seek the best. Think of the 239 oil burners—31 tooth pastes—the 161 iceless refrigerators. Which is the best?

2—It is a fallacy that the public knows the difference between price and value. Look at the stock market.

3—It is a fallacy that the public will automatically reward enterprise and service. This, I say, despite the Emerson-Hubbard fable about the mouse trap in the forest.

4—It is a fallacy that the public knows what it wants until it is told.

5—It is a fallacy that the public will demand, over any great length of time, what it is not constantly reminded of.

6—It is a fallacy that value is intrinsic, because value is to be measured by how much a thing is wanted by people who can buy it.

If we accept these, then it will at once appear how much our business stability depends on sales work, whether it be personal, advertising, propaganda—no matter what we call it—our business is worth only what we can sell it for.

European Foundrymen Meet in Paris

American to Be Vice-President—Papers Dealt with Heat Treatment, Testing, Iron Heredity, Foundry Sands and Use of Scrap

PARIS, FRANCE, Sept. 16.—The International Foundry Congress which was held here last week elected Dr. Siegfried Werner, chairman of the German Foundrymen's Association, chairman of the international committee for 1928. It was decided that the vice-presidency should be filled by an appointment to be made by the president of the American Foundrymen's Association. Automatically the vice-president will become chairman of the international committee in 1929. This is looked upon as a link with the international committee of the American Foundrymen's Association.

Among the various papers presented at the sessions of the international congress was a paper on "Separation of Graphite in Gray Iron Castings," by Doctor Schutz; "Influence of Iron and Steel Scrap on the Quality of Pig Iron," by J. L. Jones of the Westinghouse Electric & Mfg. Co.; "A Curious Example of Pig Iron Thermic Treatment," presented by Messrs. Le Thomas and Domanski; "Pig Iron Heredity," by André Levi; "A Study of Metals and Non-Ferrous Alloys and Their Uses in the Foundry," by A. Portevin; "Influence of Alumin on Aluminum Castings," by M. F. Renaud; "A Few Properties of High Manganese and Nickel Brass," by Mr. Le Thomas; "Electric Melting of Copper Alloys," and "Uses of the Electric Furnace in the Foundry," by R. Lemoine, presented by M. Vanzetti; "Tests and Properties of Foundry Sands," presented by M. Sirovich; "Simple and Rapid Method for Control of Mechanical Properties of the Structure of Cast Iron," by M. Girardet, and "A Few Methods of Testing Various Gray Iron Castings," by P. Herman and H. Henquin, presented by M. Carlier.

It was decided by the meeting to investigate the possibility of printing a dictionary of foundry expressions in several languages. Barcelona, Spain, was se-

lected for the 1928 meeting and Italy for the meeting in 1931.

In his paper on the "Influence of Iron and Steel Scrap on the Quality of Pig Iron," J. L. Jones said in part: "The utilization of heavy tonnages of pig iron and steel scrap, accumulated during the war, has to be considered with its advantages and inconveniences. The chief advantages are reduction of coke consumption by about 30 per cent, increased pig iron production by about 60 per cent and increased heating power of the blast furnace gases. On the other hand, Mr. Jones pointed out the disadvantages of the addition of scrap as trouble caused by the scrap of special steels, and oxidation and lack of uniformity. The paper recommends separation of chrome-bearing steel scrap, as it is particularly detrimental to malleable iron, and points out that too great an addition of highly oxidized scrap, such as burnt grate bars, may result in a frothy and pasty metal, which can be avoided only by using a higher percentage of coke and by adding ferromanganese for deoxidizing.

Finally, the lack of uniformity of the mixture and of its physical characteristics constitute the principal inconvenience to such additions. The author gives an account of Brinell's trials and of chemical analyses made to show this lack of uniformity. Almost always, he points out, hard spots are formed, so that many foundries in the United States heat treat their castings.

Mr. Jones said that he believed that practical experiments with pig iron obtained through the addition of scrap should be made on a larger scale, using careful physical and chemical tests, to eliminate a certain proportion of the variations in blast furnace practice. There was no discussion.

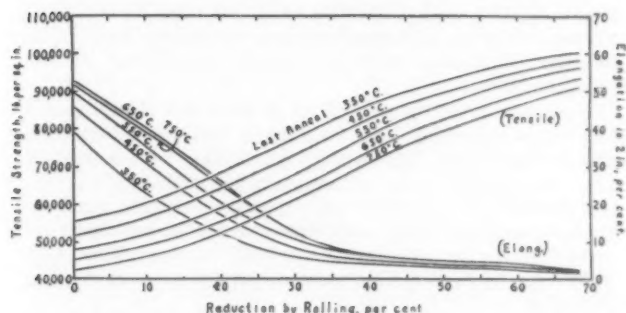
Institute of Metals Has Broad Program

Discuss Properties and Fabrication Methods for Brass, Zinc, Aluminum, Nickel and Monel Metal

THREE technical sessions of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers were held, one each on Sept. 20, 21 and 22.

Early Days of Aluminum Co. of America

An informal dinner was also held Wednesday evening, at which Earl Blough, technical director of the Aluminum Co. of America, told some of the difficulties encountered in the early years of the industry, and some of the developments which are now in course. He quoted an early letter from C. M. Hall, inventor of the extraction process, to the sales department calling attention to the fact that reserve stocks of metal were accumulating at the rate of 40 lb. per day, and it was up to them to correct this situation without delay! Since those early days there has been a constant search for new outlets for the metal, many of which, in order to be satisfied, required the development of new processes



67 Per Cent Copper, Showing Effect of Differing Anneals Previous to Final Rolling

and construction of new plants, and the overcoming of sharp competition from established materials in the new field.

Data on Commercial Alloys

Part of the papers presented to the formal sessions might be classed as theoretical metallurgy, having to do with crystal form, growth and twinning in metals, as well as with analytical methods using X-ray and visible light spectra. More than half of them, however, were highly condensed compilations of data on brass, Monel, aluminum and zinc, in all comprising a veritable handbook for the designer or user of these metals.

Cold Rolling of Brass

W. H. Bassett and C. H. Davis, American Brass Co., Waterbury, Conn., assembled the results of 25 years' study on copper-zinc alloys ranging from 100 to 62 per cent copper. The curves show in very striking manner the wide variation in physical properties after brass has been cold rolled to about 45 per cent reduction, and then annealed to various temperatures. For instance, the tensile strength and elongation after 300 and 400 deg. anneal is as follows:

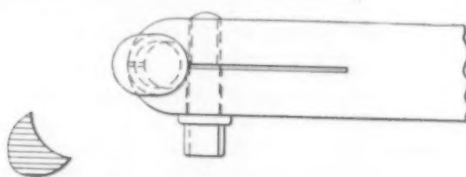
Analysis: Copper, Per Cent	Tensile Strength		Elongation	
	Annealed at 300 Deg.	Annealed at 400 Deg.	Annealed at 300 Deg.	Annealed at 400 Deg.
95	54,000	38,000	6	35
75	81,000	56,000	10	41
65	61,000	52,000	30	40

Curves representing the resistance to reversed bending of $\frac{3}{8}$ -in. strips as it is affected by composition and anneal after 45 per cent reduction are similar in shape to those showing the elongation of similar specimens. Alloys having 70 to 75 per cent copper possess the maximum endurance.

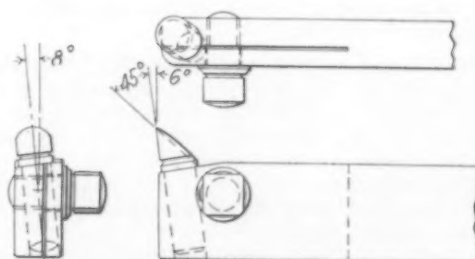
Much data concerning the hardness of all brasses after various amounts of cold work, with or without an-

nealing have been correlated with the grain size of the resulting alloy. These factors are of greatest importance to the ability to withstand subsequent cold work. For instance, a 66 per cent brass will draw more deeply when strongly annealed, but the crystal size is so large it produces a rough or "orange peel" surface. Thus, smaller grains must be produced, even at the expense of some ease in working.

Further, on account of the sensitivity of brasses to degree of reduction and time and temperature of anneal, it is difficult for close specifications to be met in commercial production. Variations in operating routine



Lathe Tool for Turning Aluminum



Planer and Shaper Tool for Aluminum

may neutralize each other, and again they may be cumulative. For instance, an accompanying illustration shows how the tensile strength and elongation (which is the fundamental reference test for sheet brass) varies with the temperature of the anneal previous to the last rolling. Without data of this sort a specification might easily be written which would be unduly restrictive, or indeed might not be possible to produce.

Pure Zinc Sheet and Strip

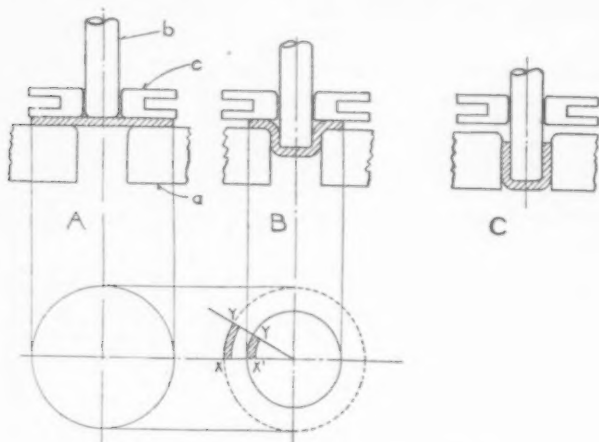
American wrought zinc, according to C. S. Trewin, New Jersey Zinc Co., New York, is from 99.9 per cent to 98.5 per cent pure, and may be had in all thicknesses from 0.006 to 1.0 inch in a wide variety of sizes. It is a material which is very sensitive to the rate of loading, consequently special testing methods are necessary. It is also self annealing, particularly if the rolls or dies are kept at about 85 deg. F., therefore the physical properties do not vary greatly with the past history. It is possible to increase the stiffness materially without sacrificing the ductility or ability to bend cold.

In deep drawing the metal is formed without reducing the thickness at any time. Reduction in diameter from the blank must not be greater than 40 per cent; subsequent draws must be limited to 20 per cent. Clear-

ances of 0.001 to 0.0015 inch, with ample fillets should be allowed. Soapy water is a good lubricant.

Machining and Working Aluminum

Proper tools for machining aluminum were described by R. L. Templin, Aluminum Co. of America, New Kensington, Pa., by comparing them with similar tools for free cutting brass and mild steel.



Cold Forming an Aluminum Shell

Cutting tools commonly used for machining free cutting brass usually have little, if any, top and side rake; they are ground on a medium to coarse abrasive wheel and used without any cutting compound or with a cutting compound that has a paraffin base. Those ordinarily used for steel have some top and side rake, are usually ground on a medium to fine abrasive wheel, and are often used with soluble-oil cutting compounds. The proper tools for aluminum and its alloys should have appreciably more side and top rake than the tools for cutting steel; should have very keen edges obtained by grinding with fine or very fine abrasive wheels supplemented in many cases by hand stoning with an oil-stone; and should be used with suitable cutting compound whenever possible. In many cases, tools suitable for machining aluminum and its alloys are not appreciably different from tools commonly used for cutting hardwoods.

Designs found suitable are illustrated. The condition of the cutting edge is of prime importance; it must be keen, smooth, and free from scratches, burrs and wire edges. Lathe, planer and shaper tools especially designed for ease in sharpening are illustrated. Resharpen by holding the bit by its shank in the chuck of a tool-grinder, and grind off the outside diameter until a keen edge is obtained.

It is best to use comparatively high cutting speeds (500 to 800 ft. per min.) and fine to medium feeds. If the chip is quite curly, the speed should be lower. A soluble cutting oil, or a half-and-half mixture of kero-

sene and lard oil, should be used; the heavier the cut, the larger the percentage of lard oil required.

Cold forming pure aluminum and its simple alloys were discussed by C. F. Nagel, Jr., of the same organization. These metals are more plastic than steel or brass, and require less intermediate annealing, but one definite limitation exists in a high coefficient of friction against the dies.

As shown in the figure, buckling during intermediate stages of a cupping operation is prevented by a hold-down ring or "blank-holder" which grips the blank before the punch approaches. To prevent seizing against either the die or the blank holder the surfaces of both must be highly polished and freely lubricated with medium grade cylinder oil. The pressure of the blank holder should be adjusted to the ultimate strength and thickness of the sheet. Slightly greater clearance is necessary between punch and die than would be allowed for steel.

When hot, aluminum is much more malleable, and in this manner window and door posts for passenger cars have been made of heavy-gage sheet. Desirable temperatures are about 950 deg. F. Quenching from contact with the relatively cold dies gives nearly as good properties in alloy sheets as could be had by separate heat treating operations. Standard steel-forming equipment is used, but an accurately controlled furnace is essential.

Nickel and Monel Metal

From a large amount of information on the commercial forms and properties of nickel and Monel metal presented by C. A. Crawford, International Nickel Co., of New York, the following about sheet may be extracted:

Neither nickel in any of its grades nor Monel metal can be hardened by heat treatment, but work-hardened material may be softened by annealing. Both metals are very sensitive to surface condition; that is to say, the ductility is greatly lowered by an oxidized surface, by a sponginess due to reduced oxide or to chemical corrosion, or by scratches from tool marks. This ductility may be restored by pickling in hot aqua regia and polishing.

Again, it is desirable to conduct the forming operations so the total reduction is more than 20 per cent and less than 30 per cent. Within these limits softening by annealing is relatively easy. Sheet worked less than 10 per cent cannot be softened by heat treatment.

Box annealing should be done at about 1400 deg. F. for 4 to 8 hr. Charcoal should be placed in the tightly sealed box to insure reducing conditions, and the work so stacked that it does not touch any iron or steel.

Open annealing in a gas filled muffle is equally good, and requires only 5 to 7 min. at 1650 to 1750 deg. F. Should there be any doubt about the formation of oxide on the surface of the metal, it should be quenched in a 1 to 80 mixture of wood alcohol in water.

Concrete Steel Fabricators Will Save by Bar Standardization

At the meeting of the Concrete Reinforcing Steel Institute in Detroit Sept. 19 and 21, George E. Routh, Jr., president, announced that it is now definitely established, through the cooperation of the United States Department of Commerce, that the current intermediate grade of new billet reinforcing steel will be the standard grade in future. The recent referendum of the Department of Commerce, it was stated, showed an overwhelming vote for the intermediate grade, and the department is now at work preparing a formal report to that effect.

"This will mean," said President Routh, "a saving of thousands of dollars for fabricators throughout the United States, who heretofore have found it necessary to stock three grades of reinforcing steel, in all sizes, to meet the whims of specifying authorities."

Mr. Routh mentioned that the institute has continued to fight the use of foreign-made reinforcing bars in all territories affected. This, he asserted, is really a problem for the mills as well as the fabricators. "But

in the absence of mill cooperation," he added, "we have fought the fight and have won out in many cases, especially where the taxpayers' money was being used for building projects and where we could justly emphasize the necessity for maintaining the high standards of living in America."

President Routh directed attention to the handbook of the institute, which is now in the hands of the printers and will be ready soon for distribution. This handbook contains a code of standard practice, specifications for placing steel, specifications for reinforced concrete, standard steel and cement specifications and design data. It is expected that the code of practice will aid in clearing up many causes for disputes between fabricators and their customers. The specifications for placing steel will serve to eliminate many of the undesirable practices in the placing of contracts for reinforcing steel.

There were two formal papers, one by F. R. McMillan, director of research Portland Cement Association, Chicago, on "The Future of Reinforced Concrete," and the other by E. St. Elmo Lewis, Detroit, on "Selling, Markets and Profits."

Electrochemists Tour the Northwest

Important Metallurgical and Hydroelectric Plants of
the United States and Canada Included in Seventeen
Day Itinerary — Technical Papers Presented

AN important and successful tour has just been completed by the American Electrochemical Society. There were almost sixty in the party, including many prominent in engineering and metallurgy from all parts of the world. Among the foreign representatives were I. J. Moltkehansen, electric furnace engineer, of Norway; Leopold Herry, electric power expert, of Belgium; Dr. Karl Staib, magnesium and lithium chemist, of Bitterfeld; Konrad Teufel, electrolytic zinc metallurgist, of Germany, and Carl Khern, manager of the large German dye works at Leverkusen.

The reception of the visitors at all of the plants was most cordial. The very free interchange of information and suggestions is bound to result in a lasting benefit to the electrometallurgical and hydroelectric industries as a whole. Everyone, Americans and Europeans alike, was impressed with the vast opportunities and potentialities of the Northwest and British Columbia. Power in almost unlimited quantities, vast coal beds in Wyoming and Washington, lumber in excess of demand, mineral deposits, in particular those of copper, lead and zinc, that have within a short generation become the most important in the world, due to the epochal developments in selective flotation, leaching and electro-winning.

Minneapolis and Its Iron Ore Testing Laboratories

THE first stop en route was made at Minneapolis. Here the well equipped and spacious laboratories of the University of Minnesota and the United States Bureau of Mines were visited. At the bureau's laboratories tests were in progress on high-manganese iron ores. T. L. Joseph and S. P. Kinney were operating an experimental 6-ton blast furnace and a small open-hearth. With ore running between 7 and 11 per cent Mn, a pig was obtained that analyzed about 12 per cent Mn. The second step in the process consists in selective oxidation of the Mn in the open-hearth furnace.

Other tests under way pertained to the cleaning of powdered coal in order to reduce the ash content. A large Wilfley table demonstrated the comparative ease of removing shale.

Norway's Electrometallurgical Industry

The afternoon at Minneapolis was devoted to a technical session. The first paper, by Dr. Ivar J. Moltkehansen, of Norway and Belgium, covered the electrometallurgical and electrothermic industries of Norway. The exports of these industries amounted to \$50,000,000 in 1926. Out of a total of 2,000,000 hp. developed in

Norway the electrochemical industries utilized 800,000.

In the discussion Eric Lof referred to the new Scandinavian plant of the Aluminum Co. of America. He felt that the Birkeland and Eyde arc process for the fixation of atmospheric nitrogen could no longer compete, not even in Norway, with the much cheaper Haber-Bosch process. Dr. Colin G. Fink, secretary of the society, referred briefly to the electric smelting of zinc at Trolhattan and the experiments of E. W. Hale in this country.

Deposits Rubber Electrolytically

Dr. S. E. Sheppard, assistant director of the Eastman research laboratories, Rochester, presented a fascinating illustrated talk on the electrodeposition of rubber. It will be of interest to steel men that strong and adherent deposits of rubber can be deposited on galvanized sheets and structural parts rendering them highly resistant to corrosion in exposed locations. Rubber produced by electrodeposition may be vulcanized readily. The process is already in commercial operation.

Two other papers, one by J. Slepian of the Westinghouse company on "Thin Film Rectifiers" and the other by S. C. Lind and George Glockler on the "Chemical Effect of Electrical Discharge in Ethane," completed the session.

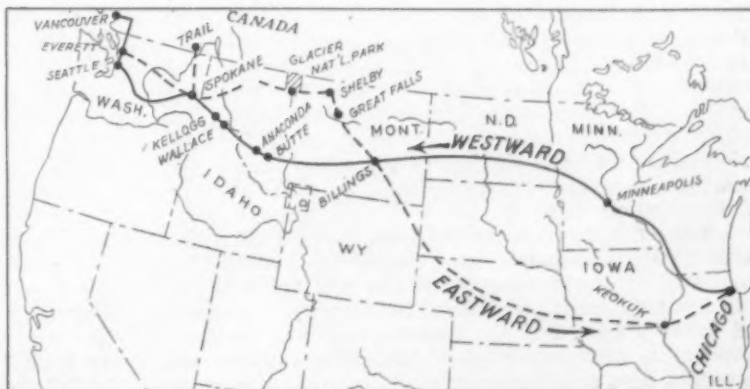
Copper Plants at Butte, Anaconda and Great Falls

A DEMONSTRATION of the production of finished copper wire starting with the ore was presented by the three plants of the Anaconda Copper Mining Co. The descent into the Leonard mine at Butte was a novel experience to most electrochemists. Thence the party was conducted through the ore reduction works and finally at Great Falls, through the electrolytic refinery. It was noticed how the mechanical concentrating devices are rapidly being displaced by flotation machinery, occupying about one-third the floor area for the same tonnage output.

Romantic Coeur d'Alene District

At Wallace, Idaho, and at Kellogg the lead-zinc-silver mines of the Federal Mining & Smelting Co., Hecla Mining Co., and Bunker Hill & Sullivan Co. were visited and later the mills and electrolytic plants. The new zinc plant of the Bunker Hill & Sullivan Co. at Kellogg is almost complete. The first unit will turn out 50 tons of zinc per day. The process is that worked out by Tainton, Pring and others and involves high

ROUTE followed on
the Northwestern
Tour of the American
Electrochemical Society.
It took over 60 people
through the non-ferrous
and ferrous metallurgical
centers of that wide
region



current densities and high acid concentrations, as compared with the Anaconda process, of low current densities and low acid.

Electrolytic Zinc the Main Topic

Throughout the trip electrolytic zinc was the main topic of discussion. Anaconda's new zinc plant at Anaconda will be turning out 150 tons daily by the first of next year bringing the total up to nearly 500 tons daily. The Consolidated Mining & Smelting Co. at Trail, B. C., is now producing 340 tons of zinc per day so that by the end of another year the Northwest will be turning out pretty nearly 1000 tons per day. And it was not long ago when one of our zinc authorities said: "Electrolytic zinc is a mere laboratory experiment." In strong contrast with this rapid progress in electrolytic zinc is the present idle capacity of the zinc retorts of the old process. Only two out of every three retorts are in operation today.

Electric Steel Furnaces in Washington

NEXT to Montana, the State of Washington offered the greatest attractions to the electrochemists. There are 18 electric iron and steel furnaces in operation or under construction within the State, 10 of which are in Seattle. The total capacity of these furnaces is 9100 kw. with a daily output of 350 tons of iron and steel. A 750-kw. electric iron ore reduction furnace is now on test. According to estimates made by the United States Geological Survey there are 63 billion tons of coal in the State within 3000 ft. of the surface.

A visit was made to the Long Lake power plant located about 40 miles outside of Spokane. The lake is 23 miles long. The station has four generators with a total capacity of 94,000 hp. The head is 172 ft. Near Seattle the electrochemists had the opportunity to see a high-head (450 ft.) power plant, the White River plant of the Puget Sound Power & Light Co. In Seattle proper the rates for industrial loads, in excess of 1000-hp. demand, are at the flat rate charge of \$30 per kilowatt-year (\$22.40 per hp.-year), a comparatively low rate.

The reception tendered the electrochemists at Vancouver was most cordial. The new University of British Columbia, situated at Vancouver, is a magnificent array of beautiful and well-equipped buildings.

Electrolytic Zinc and Copper Plants

AT Trail is located one of the finest electrolytic plants on the continent. The ore treated is most complex, carrying sulphides of copper, zinc, lead, besides silver. Modern metallurgy, which has made its biggest strides since the Armistice, separates the constituents with comparative ease and little of value is lost. The electrolytic lead plant turns out 400 tons of pure lead per day. The Betts process is used, the electrolyte being lead fluosilicate. The current density is 17 amperes per sq. ft., the cell voltage 0.40.

The electrolytic zinc plant is, next to that of Anaconda, the largest in the world. There are 2340 cells of 17 lead anodes and 16 aluminum cathodes each. The current density is 27 to 30 amperes per sq. ft. The voltage, 3.4 to 3.6. The electrolyte contains 150 grams of zinc and 135 grams of free sulphuric acid per liter.

Educational Course for Boston Chapter of Steel Treaters

Dr. V. O. Homerberg, Massachusetts Institute of Technology, Cambridge, Mass., chairman of the educational committee of the Boston chapter of the American Society for Steel Treating, has announced that the chapter will conduct an educational course in metallurgy under the auspices of the Cambridge institution. It is planned to have lectures on Friday evenings for a period of 24 weeks beginning Oct. 7. The lecture will last one hour, and will be followed by a half hour of discussion.

The tentative plan for subjects, in their respective order, will include: iron ores, fluxes, fuels, ferroalloys and fuels; blast furnace operation and properties of pig iron; mixtures, methods of melting and production of foundry iron, and the treatment of iron castings; production and properties of malleable castings and wrought iron, acid Bessemer steel, its production, prop-

The electrolytic copper refinery turns out 60 tons of copper per day. The current density is 17 amperes per sq. ft. and the voltage 0.25. The solution contains 130 grams of sulphuric acid and 40 grams of copper per liter. Gold and silver are recovered from the slimes of the lead and the copper refineries, using the acid parting process.

At the technical session held at Vancouver, papers were presented by David Caesar on "Paraaminophenol," Dr. Colin G. Fink and Charles L. Mantell on "A Laboratory Hydrogen-Oxygen Generator," Konrad Teufel on "Electrolytic Zinc"; followed by a general discussion on the utilization of coal and its by-products.

Doctor Teufel pointed out that they had found abroad that operating the zinc cells at high acid and low current density was cheaper than at high acid and high density (Tainton, see above) or at low density and low acid, which is the practice at Great Falls and at Trail. Increasing the acid from 100 to 200 grams per liter lowered the current efficiency by about 3 per cent but increased the energy efficiency by almost 7 per cent.

Ferrosilicon and Lead Alloys at Keokuk

THE last stop on the 18-day journey was made at Keokuk, Iowa, the party returning to Chicago the following day. The morning at Keokuk was devoted to an inspection of the famous dam and power plant. Plans are under way for an elaborate extension to the plant. Every bit of power of the present plant is being utilized. The Keokuk Electrometals Co., one of the larger customers, netting \$25,000 per month for power alone, manufactures 15 per cent and 45 per cent ferrosilicon. Two 1200-ampere 70-volt furnaces were in operation turning out 75 tons of alloy per day.

The United Lead Co.'s plant is devoted to the manufacture of carbide, the new furnace being equipped with Soderberg electrodes 4 ft. in diameter, Frary metal, a lead-calcium-barium alloy used as bearing metal in place of babbitt, and type metal from drosses. The Frary metal cells operate at 10 volts and 2000 amperes. The electrolyte is a fused solution of barium and calcium chlorides. The anodes are 9-in. graphite electrodes and the cathode consists of a molten bath of lead (2 tons per cell). It takes about two days to bring the composition of the lead up to 1.5 per cent Ca + Ba. The alloy is tapped. When cold it has a ring like a bell. The cells for the type metal are very similar to the Frary cells, their voltage is 25 and the amperage 2000.

Lead Anode for Chromium Plating

The third and last technical session was held at Keokuk. The first paper by Dr. A. K. Graham of Newark dealt with the structure of electrodeposited copper; the second paper by Prof. O. P. Watts, of Wisconsin, covered an investigation of the most suitable anode for chromium plating. He found that lead was the best, thus supporting what has been commercial practice for several years. The final paper by Remo Catani was a detailed mathematical treatise on the efficiency and operation of the electric furnace. We intend to publish this in part in an early issue.

The spring meeting of the society is scheduled for Bridgeport, Conn., April 27, 28 and 29, 1928.

erties and uses, and basic open-hearth practice; acid open-hearth, crucible and electric furnace practice, including some mention of steel castings; ingot forging, pressing and rolling; the principal alloy steels; testing machines; tensile physical properties of metals; and hardness and repeated stress.

A charge of \$10 per member of the chapter is made to defray the incidental expenses of the course, payments to be made in advance in two installments of \$5 each. Application for the course should be made to H. E. Handy, Saco-Lowell Shops, Lowell, Mass.

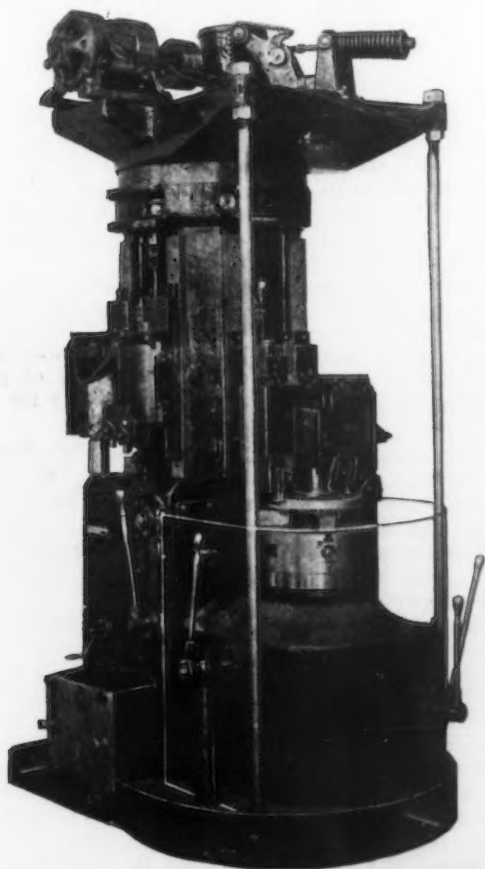
The Industrial-Brown Hoist Corporation, Cleveland, has been incorporated to succeed the Brown Hoisting Machinery Co., of Cleveland, and the Industrial Works, Bay City, Mich. The merger of these companies was recently announced. The new company is authorized to issue 150,000 shares of no par common stock and 10,000 shares of \$100 par preferred stock.

NEW VERTICAL TURRET LATHE

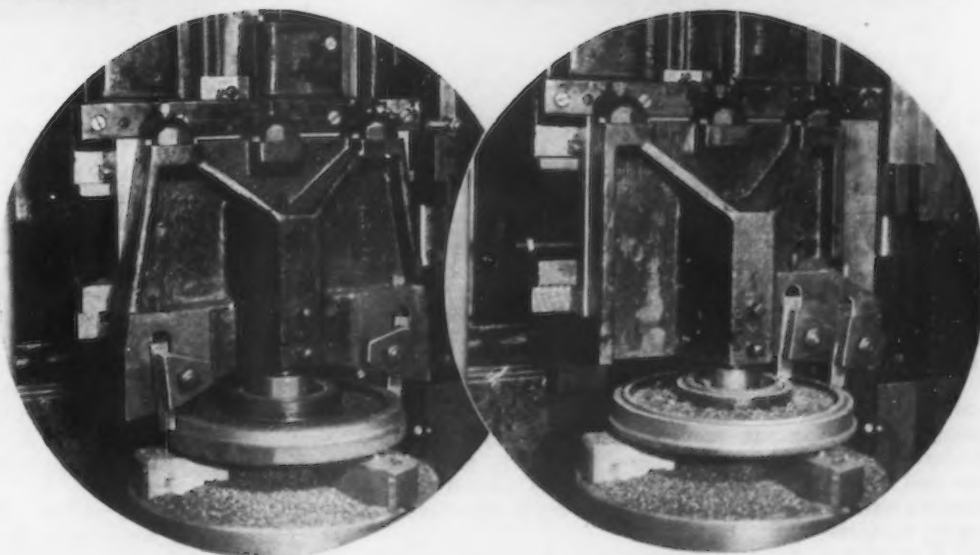
Automatic Single-Spindle Unit with Monitor Type Turret Adapted for Production Operations

ONE of the machines of distinctly new design in operation at the National Machine Tool Builders' Exposition in Cleveland, Sept. 19-23 was the Automatic vertical turret lathe of the Bullard Machine Tool Co., Bridgeport, Conn.

This machine, shown in the accompanying illustrations is a single-spindle unit with an indexing monitor type turret for boring, turning facing and similar operations. The turret has four faces, one of which is for the chucking position, the others being equipped with tool heads for multiple cutting. A group of operations may be performed simultaneously by each head; and the three working heads permit a sequence, in groups of operations to the finished piece. Provision is made for change in rates of speed and feed for each head. The complete cycle of operations is automatic, and one operator can attend several machines, according to the length of time for the complete cycle of machining operations.



The Monitor Turret Has Four Faces, One of Which Is Plain, the Other Three Being Provided With Tool-Carrying Heads. Each head may be arranged for a group of simultaneous operations as shown in the close-up views at the right. The plain face, at the upper right, is presented to the spindle during the chucking operation.



The machine is adapted for small and intermediate quantity production and an outstanding feature is its versatility. Changes in set-up, required either by changes in the design of the parts machined or because it is desired to use the machine on other work, may be conveniently and rapidly made. Although capable of low cost production on the smaller lots, because of quick set-up and the comparatively low cost of tooling the individual standard units, even greater economies are possible on larger quantities that justify block tooling. The machine is not intended, however, for the mass production field covered by the company's multiple-spindle automatics.

The machine illustrated is the 20-in. size. The bed and column casting, of rigid construction, supports all operating units. The base contains the pumps and reservoirs for cutting compound and lubricating oil. The work spindle is of the company's typical design, with two large cylindrical and a conical seat bearing. At the head of the spindle is mounted a mechanically-operated power three-jaw chuck, the chucking pressure of which may be calibrated to suit the work being held. Operation of the chuck is from a unit in the base of the machine which is controlled by a lever.

The diameter of the spindle head and power chuck body is 18 $\frac{3}{4}$ in. The swing in the clear is 24 in. in diameter up to 7 in. above the face of the chuck; 21 in. in diameter between way guards; and 16 in. in diameter up to 15 in. above the chuck face.

One plain face is provided on the monitor type turret for accessibility to gears and shafts inside. This face, which may be used also for mounting locating devices to facilitate chucking, is presented to the



spindle during the chucking operation. When the clutch mechanism is tripped by the operator the turret indexes to each of the other faces, presenting them in sequence to the work-spindle for respective operations. At the end of the cycle, the machine stops automatically with the plain turret face again presented to the work spindle.

Tool heads mounted on the three working faces of the turret may be of plain, compound, universal or of double-purpose type, providing for vertical, horizontal, angular or a combination of vertical and horizontal feeds.

As the turret registers each tool head in the working position, the feed mechanism is tripped, which causes the tool head to advance rapidly to the work and lock in position. The tool slide then feeds through the cut at the predetermined rate for that head. The tools are then returned rapidly to the retired position and the turret is indexed to the next working face.

The feed works unit which controls the spindle speed and tool feed at each head is accessibly located in the base of the machine. Independent sets of quick-change gears control respectively the speed and feed changes,

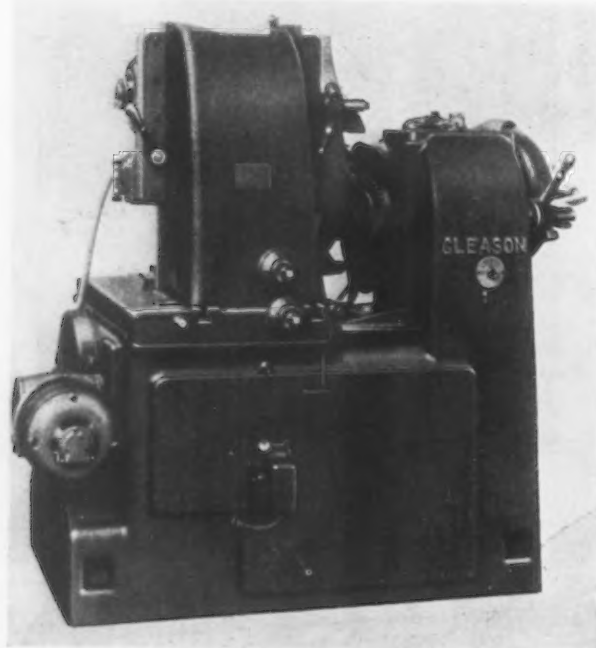
providing three series of spindle speeds having 19 changes each. The first series ranges from 7.4 to 57.5 r.p.m. and the third from 18 to 140 r.p.m. Feed gear changes are also in three series of 19 changes each from 0.0041 to 0.0322 in. per revolution and from 0.0169 to 0.1315 in., in the first and third series, respectively.

The feed cam provides a primary tool head vertical traverse of $8\frac{1}{2}$ in. This may be used in the compound head, $4\frac{1}{2}$ in. vertical, and 4 in. maximum horizontal; in the universal head $5\frac{1}{2}$ in. vertical and 3 in. maximum angular or horizontal; and in the double-purpose head, $5\frac{1}{2}$ in. vertical and 3 in. for vertical and horizontal slide traverse.

Lubrication for the operating mechanism is by gravity from a distributing reservoir at the head of the machine. Other units are arranged for lubrication by means of an Alemite Zerk pressure gun. For motor drive a $7\frac{1}{2}$ -hp. 1800-r.p.m. constant-speed motor is required. The floor space required for the machine is 72 in. front to back, and 56 in. in width. The height overall is 122 in. The weight, net, is approximately 14,000 lb.

Manufacturing Spiral Bevel Gear Generator

Spiral bevel gears up to 10 in. pitch diameter can be cut on a production basis with a new generator made by the Gleason Works, Rochester. It has been designed as a single-purpose machine and with construction as simple as possible. While it is in detail a departure from previous machines, the same basic principle of generating is used as in other Gleason equipment. The generating motion is obtained by



Generating Motion Is Obtained by Means of a Crown Gear and Segment. Simplicity and high accuracy are features

means of a crown gear and segment. Owing to the small number of parts, the machine is unusually simple and in consequence is said to be very accurate.

To clear the cutter while the blank is indexing, the unit carrying the cutter is given a lateral movement, being mounted on an upright. This makes the gib adjustments simple. The cutter spindle is mounted on ball bearings. This new feature has proved particularly advantageous, as it is said that it practically never requires adjustment.

Elimination of many moving parts has been made

by the use of three motors. One is used for the cutter drive, a second for producing the feed and generating motion, and the third for the index. An automatic controller and push button control station, with start, stop and jog positions, are required for the first two motors. The indexing motor, however, is directly connected and runs continually.

Indexing is of the worm and worm wheel type. This permits the use of change gears where it is required to index for differing numbers of teeth. The machine is designed so that either one of two work-carrying heads may be supplied. One is for gears of pitch angles greater than 63 deg. 26 min.; the other for pinions of pitch angles less than 26 deg. 34 min.

One operator can handle several machines, because an automatic stop controls the motor for the cutter, feed and generating motions as soon as a gear is completed. The chips drop into a basket, from which they are tipped when it is full into a second basket for removal. This leaves the first basket continually in position and avoids stopping operation.

Except for a few easily accessible hand oilers, which require infrequent attention, the machine is automatically lubricated. Oil passes through a filter and two oil sights permit the operator to watch the quantity. This eliminates the cost of hand oiling and of shutdown for that purpose. Both the cutting oil and the lubricating oil are replenished from the rear.

Compactness of the machine is such that it occupies a floor area only 3 ft. 10 in. x 5 ft. 7 in. The machines can be arranged in battery formation, with spacers to join them. The surfaces adjacent to the spacers are planed parallel to give true and tight joints. A change in the set-up on any one machine can be made while the others of the battery are in operation.

Associated Machine Tool Dealers Meet

The Associated Machine Tool Dealers met at the Hollenden Hotel, Cleveland, Thursday, Sept. 22, during the Machine Tool Builders Exposition. Election of officers was as follows: President, J. R. Porter, Marshall-Huschart Co., Chicago; vice-president, Tyler W. Carlisle, Strong, Carlisle & Hammond Co., Cleveland; secretary, E. Porter Essley, E. L. Essley Machinery Co., Chicago, and treasurer, George H. Cherrington, Brown & Zortman Machinery Co., Pittsburgh.

The following are members of the executive committee: E. P. Ridings, Syracuse Supply Co., Syracuse, N. Y.; W. J. Radcliffe, E. A. Kinsey Co., Cincinnati; J. W. Wright, Colcord-Wright Machinery & Supply Co., St. Louis.

The next meeting will be held in the spring of 1928, the place of the meeting to be decided upon at a later date.

Testing Engineers Meet in Holland

Recommend a New International Association for Testing Materials at Congress in Amsterdam —Two Days' Sessions

(Special Correspondence)

AMSTERDAM, HOLLAND, Sept. 13.—The International Congress for Testing Materials, held in Amsterdam, was the outcome of the work of an organization committee of Swiss and Dutch engineers and manufacturers who felt that the work of the old International Association for Testing Materials, which died as the result of the World War, should be taken up again. As a consequence delegates had been called for from all the countries formerly active in testing work, and a registration of 460 members was achieved.

Previous to the formal reception, there was a meeting of the official delegates to determine whether the time was already ripe to revive the old association. Considerable opposition developed, more than likely caused by a change in the field formerly covered, rather than race animosities. The calling into life of numerous national engineering standards committees has circumscribed the field of the old body, and if the question of harmonizing the existing national specifications for materials of construction to give them an international value is solved with reasonable speed, testing congresses will confine themselves strictly to that field of operation.

The delegates' meeting decided to recommend the formation of a "New" International Association for Testing Materials, and a committee was appointed to draft suitable resolutions for presentation to the congress later on in the sessions.

The formal reception of the delegates and their ladies was held in the spacious halls of the Dutch Colonial Institute, where, surrounded by the fine collections of commercial products from the Dutch East and West Indian colonies, with exhibits of the gathering and processing of the raw materials involved, the Honorary Congress Committee, headed by Conrad F. Stork, of Hengelo, welcomed the members attending in the name of the Dutch Government, the engineering and industrial societies, the city and its civic interests. The addresses were delivered in French, English and German, and it is understood that in some of the sessions Italian will be used also.

The lecture of the evening was given by Dr. G. Holst, on the results of work done in the research laboratory of his company. Of the many interesting developments brought out, IRON AGE readers will be attracted specially by the tungsten results, which in fine filament work show a most remarkable strength; wrought iron, steel and tungsten tensile strengths for the same filament area run as 40, 100 and 400, respectively. This would show some interesting possibilities for delicate machinery construction, since very large rods of tungsten were shown. These were made up of aggregated tungsten particles cemented by a binder into long rods, through which heavy currents were passed and the hot material swaged under the press, and the welded product drawn through a diamond die into wires and eventually filaments for lamp purposes.

American Contribution on Standards

The following day, Sept. 13, the general meeting was opened by a lecture by T. D. Lynch, manager of the materials and process engineering department of the Westinghouse interests. This was an able presentation of the origin, development and benefits of scientific testing, research and eventual development of commercial specifications. Mr. Lynch discussed testing as a science and an art; how accurate data were obtainable which in their eventual application to works proc-

esses brought out astonishing improvements. He illustrated this with the present development of springs of alloy steel used in traction construction.

The question of what "standards" are was gone into and the different types of men developing them discussed. As an interesting piece of information to European engineers, he cited the report of the Department of Commerce showing the existence in the United States at the present time of 27,000 standards in regular use.

Research work was next dwelt upon, and the need of coordinating it with commercial facts and requirements emphasized. Finally, the future of testing work was touched on by Mr. Lynch, who instanced the present trend toward investigations in physical chemistry, and stated that there were still many questions to be solved.

After a recess for interchange of views by the delegates informally, the meeting was reconvened and a lecture delivered by Prof. A. Mesnager, of Paris, on the subject of the rupture of solids. This was a highly theoretical discussion on the behavior of materials under the various application of loads with the specimens either smooth or notched. Unfortunately, none of the papers or lectures were obtainable in pre-printed form, nor were any of them given other than in the language written. Hence, those not able to understand the language used by the authors of the papers lost just so much time. In former congresses at least a short summary was given in two other languages, so that every one attending had some profit.

Caution Raised on Silicon Structural Steel

The afternoon session for metals was opened with a paper by Dr. Gallik, of Budapest, on the question of high grade structural steels. The gradual increase in the physical strengths and elongations in these steels as they were used for important structures in bridges and buildings was traced by the author, and thus brought up to the introduction of the silicon, low-carbon steels showing high strengths and elongations, the analysis being around the following: Carbon, 0.15 per cent; manganese, 0.80, and silicon, 0.90.

In the discussion that followed, and which brought out additional information on the value of the silicon structural steels, it was pointed out in rebuttal that we have gone too far in this direction for the moment, and it would be safer to go back to 0.50 per cent silicon, use more metal and learn something about the effect of riveting on the plates. In German bridge-building for railroad service, where formerly the deflection allowed was 1 in 2000, the ratio had gradually increased to 1 in 1400, 1 in 1000 and now is very near to 1 in 600, which is a dangerous proceeding in view of our lack of knowledge on swaying under the rolling load.

Dr. E. C. Bain, of the Union Carbon & Carbide Laboratories, then read the paper of Dr. John A. Mathews on "Corrosion-Resistant Steels," in which a classification of the high grade alloy steels was given, their properties and specific uses were elaborated, and particular stress laid upon the group used in industries where corrosion has to be closely watched. The paper was considerably discussed.

Prof. A. Portevin, of Paris, then read his paper on the "Mechanical Testing of Gray Iron Castings." This

(Concluded on page 918)

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

GENERAL BUSINESS OUTLOOK

Favorable Factors

1. The P-V line rises.
2. Commodity price trend upward.
3. Retail trade expands.
4. Building activity well sustained; trend of permits upward.
5. Farm purchasing power improved; rising mail order sales.
6. Foreign trade recovery in August.
7. Light mercantile inventories.
8. More favorable weather conditions.
9. Money very easy, considering the season.

Unfavorable Factors

1. Automobile industry continues unsettled and backward.
2. Increased foreign competition.
3. Declining freight traffic and railroad earnings.
4. Narrower profit margins in business; business failures numerous.
5. Large physical inventories in hands of manufacturers.
6. Excessive speculation; very large brokers' loans.
7. Political unsettlement.

CONDITIONS on the whole appear to be ready for some expansion of business, but the immediate stimulus is still lacking. The reason why expansion is so slow in developing is to be found chiefly in the ample supplies of commodities, due to the fact that production has suffered a relatively small curtailment in recent months and the stocks of commodities in producers' hands are large. The upward trend of commodity prices is not sufficiently pronounced to stimulate much forward buying. Naturally buyers are cautious. But business is in large volume and, with money and credit so easy and prices gradually working higher, a recovery is to be expected and should develop within the next 30 days.

Better Business Forecast by Rise in P-V Line

AMONG our regular business barometers, the most notable development which occurred last month was the rise in the P-V line. This line, it will be remembered, is a barometer that usually anticipates the trend of general business by several months. The August gain was unusually sharp. Even making allowance for the imperfections in our measurements of industry through statistics, the upturn was so pronounced as to constitute a definitely favorable forecast. The line is now practically at its estimated normal (which we put at 95) and probably September data will cause it to rise above normal. Such a crossing generally indicates a turning point in business, and the present one suggests that the expected improvement is near at hand.

By the same token, the continued recession in the steel industry should terminate in the near future. At present the steel industry (like most other basic industries) is under the influence of unfavorable demand and supply conditions, which were forecast by the decline of the P-V line and by its low level down to the middle of this year. A better balance between demand and supply conditions in most markets is now indicated.

When a general rise in commodity prices is definitely established and general business begins to expand, buying of steel, also, will pick up. The steel industry at present is not in a strong situation, and the reasons for this condition may be stated as follows:

- (1) There has been a long period of above-normal production of iron and steel.
- (2) Steel consumption has been limited by a number

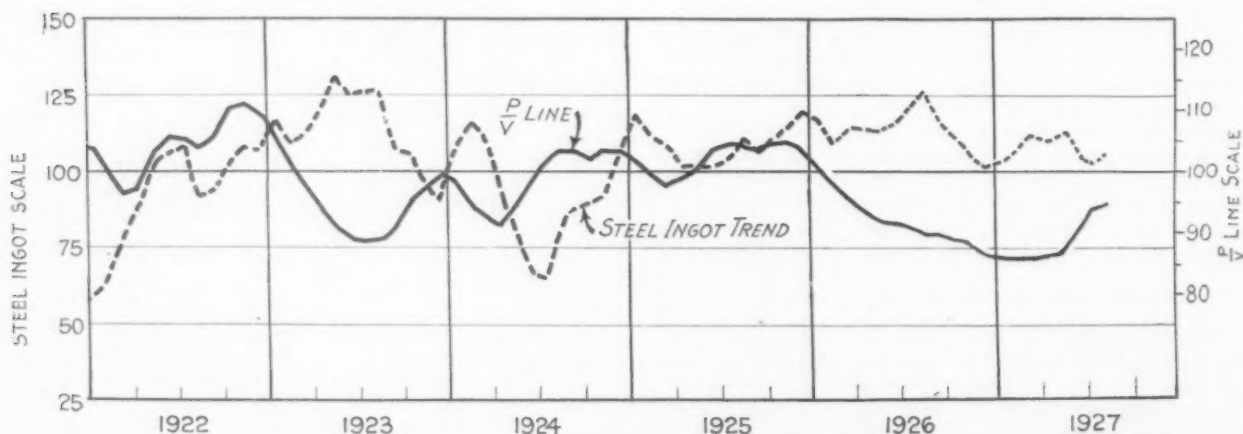
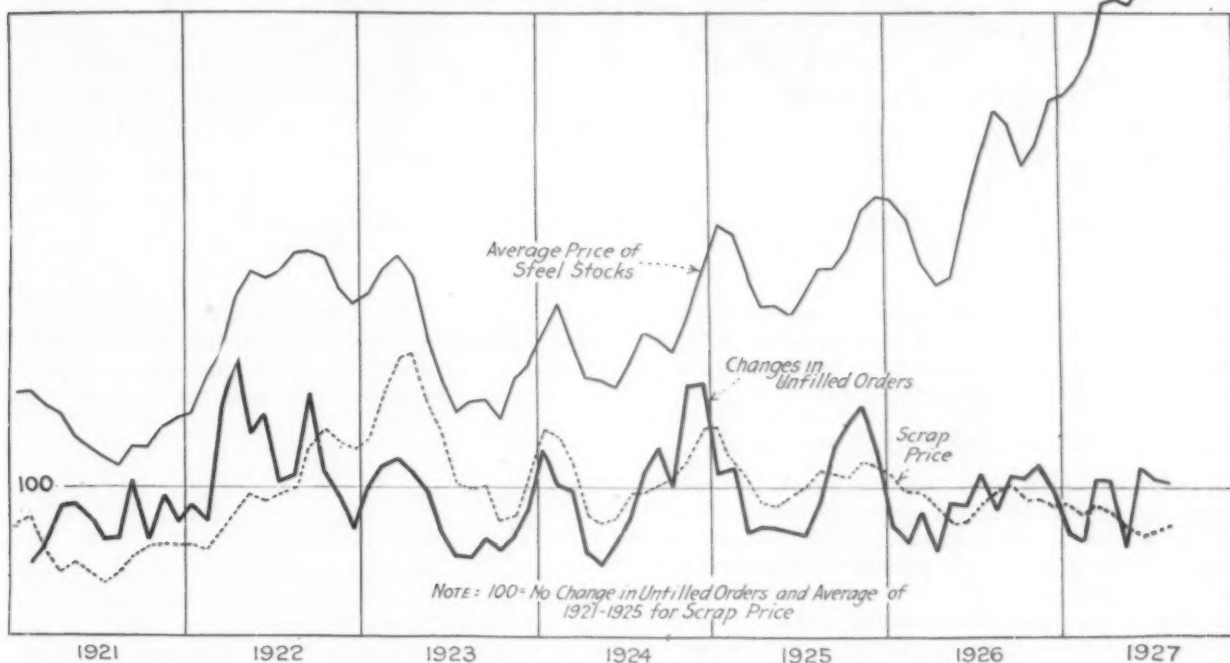


Fig. 1—August Upturn of the P-V Line (Representing the Ratio of Commodity Prices to the Physical Volume of Trade) Was Unusually Sharp. Now at its estimated normal, it presages improvement in business and forecasts both better buying and firmer prices. Ingot production, meantime, is high, in view of the slackness of railroad and automotive purchases

Fig. 2—Recent Movements of the Curve Showing the Rate of Change in Unfilled Orders and the Curve of Scrap Prices Have Little Meaning. Neither forecasts the spectacular rise in stock prices, which may be of unsound character



of unfavorable conditions, among which the chief are:

- (a) Decline in automobile sales and production.
- (b) Recovery in European production.
- (c) Failure of the railroads to show seasonal gains in freight traffic and earnings.
- (d) Termination of the period of expansion in building activity.

These conditions still exist. At the present juncture, it seems doubtful if any large recovery in the steel industry will come until either (1) the production of steel is curtailed further (say sufficiently to bring the ingot production curve below the normal level) or (2) the P-V line rises further, or (3) both of these developments occur, so as to bring the barometer line above the steel curve (see Fig. 1).

Spectacular Rise in Steel Company Shares

THERE has been no change in the trend of the steel barometers shown in the second chart during the last month, and exactly the same remarks as were made a month ago might be repeated. The unfilled orders of the Steel Corporation increased a little in August,

but again the net advance above the merely seasonal movement was smaller than the advance in the preceding month, so that the rate-of-change line declined a trifle for the second month.

Steel scrap markets averaged a trifle higher in August than in July, causing the scrap curve to rise much as in the earlier month. But the market continued hesitant and irregular and no quotable change in the general level of heavy melting steel scrap has occurred during the last five weeks. Evidently scrap, like pig iron, is scraping bottom, but the market awaits an expansion in the demand for steel.

As in July, steel stocks as a group advanced in August on the New York Stock Exchange, making a new high. The movement, however, bears evidence of speculative excess and is clearly not based on the trend of current earnings or of the probable earnings in the near future. A sharp setback in the market, which occurred last week, casts doubt on the soundness of the situation. Stock market appraisals are fearfully and wonderfully made. The high levels obtaining for some steel stocks may be discounting a more brilliant future

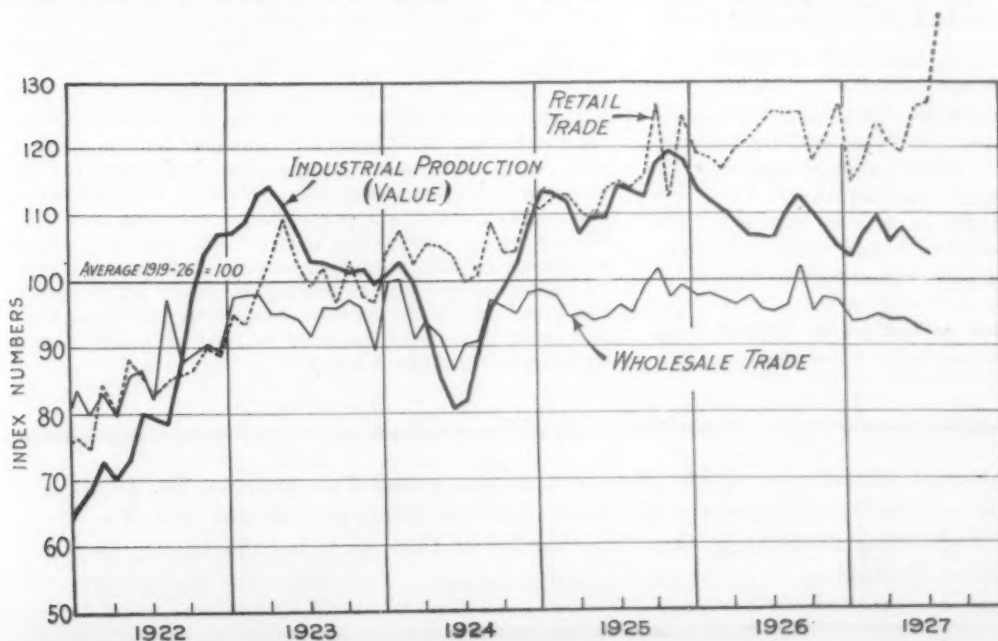


Fig. 3—Retail Trade Volume Is Not Only Well Above Both Production in Basic Industries and Wholesale Trade, but Has Reached What Is Probably the Highest Point on Record. Industrial production continues in heavy volume, while wholesale trade is lagging

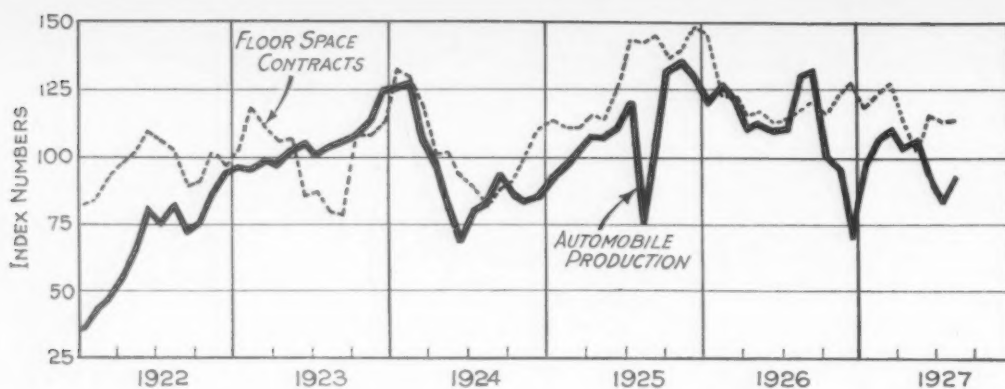


Fig. 4—Potential Demand for Steel from Construction and Automotive Sources Is Not Bad. Building activity is above the 1921-25 average and automobile production not far below

which is quite remote. Then, again, they may merely reflect the play of idle funds now accumulated in New York. Certainly the barometer lines have not foretold the sharp rise that occurred in August.

Retail Trade Probably at Record High

IN terms of dollar sales, the most notable development in general business last month was a sharp rise in the volume of retail trade. In August our adjusted index of retail sales reached what is probably the highest point on record. It was more than 10 per cent above a year ago. This is a large gain, even after allowing for the fact that the number of working days in August this year was larger than in the same month last year.

So sharp an advance has in the past sometimes been immediately followed by considerable declines (1923 and 1925). The most significant point, however, is the high general level that is indicated. In the last few years the generally sustained volume of retail buying has insured against depressions or prolonged declines in industry. The same insurance is still in force.

Retail trade is high, not only compared with its own past but also when compared with production and wholesale trade. Though the latter are known only through July it is clear that retail trade is far higher than they are. It seems inevitable that so large a volume of consumer buying will take care of any troublesome inventories in the hands of manufacturers, and that before long it will invite, or at least allow, a rise in the value of industrial production. Of course, such a rise may occur through either higher prices or a larger quantity output. Already prices average a little higher and, if our reasoning is correct, a gain in physical volume will follow.

Building and Automobile Situation Not Bad

OUR fourth chart shows the trend of activity in two of the chief steel-consuming industries. The situation which is revealed as affecting the potential demand for steel is not bad. Building activity is above the average of the years 1921-25 and automobile production is but little below that average. The floor space in building contracts in August shows an adjusted index of 113.3 per cent of the 1921-25 average against 113.2 per cent in July, and compares with 117.9 a year ago.

Automobile production picked up in August and, considering the Ford situation, did not make a bad

showing. The 315,600 cars and trucks which were produced in the United States and Canada represent 93.4 per cent of the 1921-25 average, against 82.4 per cent in July, due allowance being made for seasonal conditions.

Fluctuations in Industrial Activity Average Less Than 5 Per Cent

Business progress during the past few months, as reflected in wage and employment statistics constituting fundamental elements in measuring industrial activity, inspires confidence rather than apprehension, and the recent stiffening of commodity prices is indicative of at least a normal seasonal increase in the demand for products, in the view of the National Industrial Conference Board, 247 Park Avenue, New York.

The element of confidence, in the view of the conference board, is to be derived from the fact that in spite of various outside influences that might be expected to act unfavorably on business, such as the approach of a presidential election, disturbances in foreign affairs, a season of floods and generally unfavorable weather, industrial activity in the United States has suffered no noticeable depression even in the branches of industry which have made such unprecedented records during the past two years.

While employment and the total number of hours worked in manufacturing plants have declined slightly since last March, and in July this year were somewhat lower than in the corresponding month a year ago, all such fluctuations recorded during the past 12 months averaged less than 5 per cent, according to the data collected by the conference board among about 2000 representative establishments in 25 different industries.

Average weekly earnings per wage earner, while showing a seasonal decline in July were at the same level as in the corresponding month a year ago. Average hourly earnings, a sensitive indicator of wage rates paid, were even 1 per cent higher than in the same month last year, and since last April have been as high as, or higher than, at any time during 1926.

In interpreting these data, emphasis should be laid not on such slight fluctuations as have occurred, declares Magnus W. Alexander, president of the conference board, but rather on the minuteness of the fluctuations as indicative of the increasing stability that has marked American industrial and commercial life during the past five years, in great contrast to business conditions in Europe, where during that period political agitation and uncertainty, widespread labor unrest and fiscal complications have caused frequent and violent interruptions of business activity in most of the important industrial countries.

Schedule of the next installments of the *Business Analysis and Forecast*, by Dr. Lewis H. Haney, Director of New York University Bureau of Business Research, follows: **Oct. 13**—Activity in Steel Consuming Industries; **Oct. 20**—Position of Iron and Steel Producers; **Oct. 27**—General Business Outlook.

INCIDENTAL ACCIDENT COSTS

Frequently Overlooked Costs Greatly Increase Employers' Losses

INCIDENTAL losses in the aggregate constitute a large part of the cost of accidents, according to H. W. Heinrich, assistant superintendent Travelers Insurance Co., Hartford, who addressed the sixteenth annual safety congress of the National Safety Council at the Stevens Hotel, Chicago, this week. In fact, compensation payments, he says, make up only one-fifth of the total losses from preventable accidents.

Among the minor items in the losses of time, which, however, are of large importance when considered as a whole, are: Cost of time of injured employee; cost of time lost by other employees who stop work to assist the injured, or out of curiosity or sympathy or for any other reason; cost of time lost by foremen and other shop executives in assisting injured employees, investigating cause of accident, arranging for continuance of injured employee's work by other workmen, and in preparing accident reports or in attending hearings before an industrial commissioner. There are also the injury done to machine tools or other equipment, incidental cost due to interference with shop routine, and many other items.

The prevention of injuries to employees is not only a humanitarian work, but it is good business, Mr. Heinrich asserted, and it is necessary from a purely mercenary point of view. Employers who are not now taking adequate measures for accident prevention should be awakened to the need for such action, the speaker said, and every plant should be gone over by a trained safety engineer.

New officers of the National Safety Council were announced at the annual banquet Wednesday evening at the Stevens Hotel. The principal officers are: President, H. E. Niesz, Commonwealth Edison Co., Chicago; vice-presidents, E. W. Beck, United States Rubber Co., New York; C. E. Hill, New York Central Lines; Miller McClintock, Harvard University; C. J. Moore, Longmeadow, Mass.; C. E. Pettibone, American Mutual Liability Insurance Co.; H. A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.; G. E. Sanford, General Electric Co., Schenectady, N. Y.; A. W. Whitney, National Bureau of Casualty and Surety Underwriters, New York; Prof. C. E. A. Winslow, Yale University; treasurer, G. T. Hellmuth, Chicago, North Shore & Milwaukee Railroad Co., Chicago; managing director, W. H. Cameron, Chicago.

Stearns Conveyor Co. Designed Continuous Foundry for Elmira Plant

In some unfortunate manner, proper credit in the leading article in *THE IRON AGE* for Aug. 18 was not given to the Stearns Conveyor Co. (a subsidiary of Chain Belt Co.), Cleveland, the designer of the entire assembly and manufacturer of the conveyors used in the new installation for Elmira Foundry Co. At this late date acknowledgment is made for the photographs and information used in preparing the account.

Expands Westinghouse School for Electric Welding

The growth of the field of arc welding has caused such a demand for welder operators that the Westinghouse Electric & Mfg. Co., which for some time has been conducting a welding school at which an intensive training course covering a month has been given, has decided to lengthen the course to three months and to double the enrollment. The course will also be open to students of the Westinghouse Technical Night School. The welding committee, which has charge of the school, is also extending its activities in other directions. It will make a wide study of welding applications to all classes of Westinghouse apparatus; and also a study of welding machinery with an idea of improving it and will specially consider arc welding as applied to steel frame structures.

J. R. Weaver, assistant superintendent of the equip-

ment department, is chairman of the committee, which includes W. H. Himes, mechanical engineer; A. M. Candy, general engineer; G. W. Goebel, chief inspector; W. W. Reddie, motor apparatus sales; C. C. Brinton, manufacturing engineer, and P. E. Henninger, superintendent tool department.

Standardized Steel Hangar Construction Recommended

WASHINGTON, Sept. 24.—Aircraft hangar framework should be of structural steel, covered with sheet steel, by an asbestos composition, or by a painted rust-resisting alloy, said the Aeronautics Branch of the Department of Commerce last week, in making its first formal recommendation for this type of fast growing construction, which promises to require considerable quantities of steel. The steel type of hangar, the aeronautics branch stated, may be easily increased or decreased in size, or dismantled for removal to a new location when necessary.

The statement proceeds to suggest other specifications. For an open-end hanger in standard conventional sections specifications are given which would allow for a large range of sizes for individual requirements. The width suggested is 60 ft. to 110 ft. in units of 10 ft., and the height 12 ft. to 28 ft. in units of 2 ft. Standard bar steel is recommended for the sashes.

Harbison-Walker Acquires Walsh Fire Clay Products Co.

The Harbison-Walker Refractories Co., Pittsburgh, through an exchange of stock has acquired the Walsh Fire Clay Products Co., of St. Louis. The Walsh plant at Vandalia, Mo., with its daily capacity of some 150,000 9-in. fire brick, increases the capacity of Harbison-Walker, already the world's largest producer of refractories, by approximately 10 per cent.

The Walsh company is one of the oldest producers in the St. Louis district and incidentally the largest. Its plant within recent years has been completely modernized through the introduction of continuous kilns and modern type of clay working machinery.

The Harbison-Walker company hitherto has had no plants west of the Mississippi, and acquisition of the Walsh company rounds out its production to include all the major fields of the ceramic industry.

Elyria Company Now Steel & Tubes, Incorporated

The Elyria Iron & Steel Co., Cleveland, has changed its name to Steel & Tubes Incorporated, which better indicates the company's present line of products, which includes welded steel tubing and cold rolled strip steel. The company owns plants in Cleveland, Elyria and Toledo, Ohio; a plant in Gulph, Ontario, known as the Canadian Metal Products Co., Ltd., and recently acquired the Brooklyn, N. Y., plant of the Mohegan Tube Co., the name of which has been changed to the Steel & Tubes Co. of New York.

Contract for Ten Billion Feet of Gas

The Public Service Corporation of New Jersey has arranged for the purchase of a minimum of ten billion cubic feet of gas during the next ten years from International Combustion Engineering Corporation's new low-temperature coal carbonization plant, to be erected at New Brunswick, N. J. The plant will produce also 6,000,000 gal. a year of coal tar, which has been contracted for by F. J. Lewis Mfg. Co., Chicago, and 1,250,000 gal. of crude motor spirits.

The number of telephones manufactured by the Western Electric Co., at the Hawthorne Works, Chicago, since 1881, when the company was chosen as the manufacturing unit for the Bell system, has passed the 22,000,000 mark.

Annual Meeting of Iron and Steel Electrical Engineers

More than 300 members of the Association of Iron and Steel Electrical Engineers took advantage of an invitation of the Jones & Laughlin Steel Corporation to inspect its Aliquippa works, Woodlawn, Pa., on the afternoon of Sept. 22. In the past two years extensive additions have been made at that plant, including 122 by-product coke ovens, a 16-in. to 14-in. 12-stand merchant mill, two butt-weld pipe mills and a seamless pipe mill, all of which were in the tour.

The annual meeting of the association was held at the William Penn Hotel, Pittsburgh, in the evening and the new officers for the coming year were announced. They are:

President, A. J. Standing, electrical superintendent Saucon works Bethlehem Steel Co., Bethlehem, Pa.; first vice-president, C. S. Proudfoot, general manager United States Ferroalloys Corporation, Buffalo; second vice-president, F. W. Cramer, assistant electrical superintendent, Bethlehem Steel Co., Johnstown, Pa.; treasurer, James Farrington, electrical superintendent La Belle works, Wheeling Steel Corporation, Steubenville, Ohio; secretary, A. G. Place, electrical superintendent Youngstown Sheet & Tube Co., Youngstown, Ohio. The new directors are: W. J. Harper, combustion engineer Donner Steel Co., Buffalo; John Oartel, director of safety Carnegie Steel Co., Pittsburgh; Elbert Lewis, South works, Illinois Steel Co., South Chicago; W. W. Garrett, Tennessee Coal, Iron & Railroad Co., Birmingham, and A. L. Reichert, Cleveland.

Taylor Allderdice, president National Tube Co., Pittsburgh, William G. Clyde, president Carnegie Steel Co., Pittsburgh, E. J. Buffington, president Illinois Steel Co., Chicago, William H. Donner, president Donner Steel Co., Buffalo, and R. H. McMasters, president Steel Co. of Canada, Ltd., were elected honorary members of the association.

The meeting was concluded with a paper, "Installations at the Woodlawn Plant of the Jones & Laughlin Steel Corporation," presented by R. M. Hussey, electrical superintendent, who told of the sources of supplies of electrical power, the drives and other electrical features of the Woodlawn plant.

Foundry Equipment Sales Gain

August sales of 18 members of the Foundry Equipment Manufacturers Association totaled \$389,946, a gain of 18 per cent over the July figure, but a loss of 22 per cent compared with the total for August, 1926. Shipments in August were 8 per cent smaller than in the previous month and $\frac{3}{4}$ per cent smaller than in August, 1926. Orders on hand Sept. 1, at \$529,433, showed a loss of 28 per cent as compared with the total on Aug. 1.

Coke Oven and Blast Furnace Meeting to Hear C. A. Meissner

The fall meeting of the Eastern States Blast Furnace and Coke Oven Association, to be held at the Shannopin Country Club, Ben Avon, Pa., Friday, Oct. 7, will begin with a luncheon at noon, which is to be followed by round-table discussions of coke oven and blast furnace topics. These discussions are to be held simultaneously, with Caleb Davies, Jr., assistant general superintendent Republic Iron & Steel Co., Youngstown, Ohio, chairman of the coke oven meeting, and George W. Vreeland, assistant general manager Weirton Steel Co., Weirton, W. Va., presiding over the blast furnace discussion. Following dinner in the evening, C. A. Meissner, chairman blast furnace, coke oven and open-hearth committees of the United States Steel Corporation, will make an address, "Recent Developments in the Manufacture of Coke, Iron and Steel."

Southern Fabricators Adopt Standard List of Shapes

The Southern Structural Steel Board of Trade, at a recent meeting at Birmingham, adopted a revised list of structural shapes, plates, etc., for the use of architects and engineers in designing work. In the past it has been the practice of many architects and engineers to consult a handbook and to select any size in it, whereas the new list shows the popular sizes, which can be obtained from stock. The action of the fabricators is expected to enable them to reduce their inventories and to make much quicker shipments. The mills will also benefit, since they will be able to cut down the number of roll changes.

Organize Steel Club of Cleveland

An organization of heads of sales offices of steel companies in Cleveland was formed at an initial meeting held at the Cleveland Athletic Club, Sept. 26. It will be known as the Steel Club of Cleveland.

The following officers were elected: J. G. Carruthers, Otis Steel Co., president; J. S. McKesson, Corrigan, McKinney Steel Co., vice-president; T. M. Galbreath, Sharon Steel Hoop Co., secretary-treasurer. These officers, together with two directors, F. L. Gibbons, Central Alloy Steel Corporation, and H. C. Richardson, Donner Steel Co., comprise the board of governors. The organization is purely a social one, having no business function, and is modeled along lines similar to the Steel Clubs of Philadelphia and Detroit. In addition to regular monthly luncheons, it is planned to hold occasional social functions to which guests will be invited. The majority of steel companies whose sales offices are located in Cleveland are represented in this club.

COMING MEETINGS

October

American Society of Mechanical Engineers. Oct. 10 to 13. First National Fuels Meeting. Statler Hotel, St. Louis. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Association of Farm Equipment Manufacturers. Oct. 12 to 14. Thirty-fourth annual convention, Congress Hotel, Chicago.

American Hardware Manufacturers' Association and National Hardware Association. Oct. 17 to 20. Joint meeting, Marlborough-Blenheim Hotel, Atlantic City. Charles F. Rockwell, 342 Madison Avenue, New York, secretary of the former association, and T. James Fernley, 505 Arch Street, Philadelphia, secretary of the latter.

American Institute of Mining and Metallurgical Engineers. Oct. 19 and 20. Petroleum

Division, Fort Worth, Tex. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

American Gear Manufacturers Association. Oct. 20 to 22. Semi-annual meeting, Mount Royal Hotel, Montreal. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Society of Mechanical Engineers. Oct. 26 and 27. Management meeting, Sagamore Hotel, Rochester. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Institute of Steel Construction. Oct. 25 to 29. Fifth annual convention, Carolina Hotel, Pinehurst, N. C. Charles F. Abbott, 285 Madison Avenue, New York, executive director.

American Iron and Steel Institute. Oct. 28. Annual meeting, Commodore Hotel, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

LARGE PLATE BOOKINGS

Fabricated Steel Plate in August Largest Since March—Oil-Storage Tanks Predominate

WASHINGTON, Sept. 27.—Aggregating 48,277 tons, August bookings of fabricated steel plate represented 60.1 per cent of capacity, according to reports received by the Department of Commerce from 51 plants. This largest total since March compares with 35,326 tons booked in July, representing 43.9 per cent of capacity. Of the August bookings, 29,391 tons was for oil-storage tanks, against 17,199 tons in July; 1637 tons for refinery materials and equipment, compared with 2057 tons; 1879 tons for tank cars, as against 225 tons; 3504 tons for gas holders, compared with 1034 tons; 481 tons for blast furnaces, compared with 537 tons; and 11,385 tons for stacks and miscellaneous purposes, against 14,274 tons.

For the eight months ended with August bookings totaled 348,548 tons, or 54.2 per cent of capacity, against 337,223 tons, or 51.1 per cent of capacity, for the corresponding period of 1926. The gain was about 3½ per cent. Respective bookings for the two periods were as follows: 154,318 tons and 99,490 tons for oil-storage tanks; 17,137 tons and 24,212 tons for refinery materials and equipment; 21,735 tons and 19,391 tons for tank cars; 29,238 tons and 38,311 tons for gas holders; 4859 tons and 10,342 tons for blast furnaces and 121,261 tons and 145,477 tons for stacks and miscellaneous purposes.

For Marking British Imports of Woven Wire

WASHINGTON, Sept. 27.—The standing committee of the Board of Trade of Great Britain has reported favorably on applications for an order requiring a mark of origin on imported woven wire, wire netting and mill bobbins, according to a report received by the Department of Commerce from the American Consul General at London. Recommendation was made that in the case of wire netting or woven wire the roll or bundle should bear conspicuously either on the outside or so as to be visible through the mesh, a label not less than 8 in. in diameter. Chain link fencing is included as wire netting or woven wire. Both of the reports restrict their recommendations to sale orders, neither of them considering that marking on importation is necessary. These reports will have to be laid before Parliament before orders in council can be made.

Protest Against Higher Duty on Silico-Alluminum Alloy

WASHINGTON, Sept. 27.—Protests have been made to the Division of Customs, Treasury Department, against the decision under date of Sept. 10 holding that aluminin is properly dutiable under paragraph 374 of the Fordney-McCumber act covering articles of which aluminum is the component material of chief value, and providing for a duty of 5c. per lb. when in crude form. Domestic steel producers who use the alloy, imported chiefly from Switzerland and France, contend that the old classification under paragraph 302 covering iron and steel and a number of alloys, including ferrosilicon, is the proper one. Under the latter paragraph the duty was 2c. per lb. Appeal also has been made to the division to extend the effective date, allowing 90 days instead of the usual 30 days in which to receive shipments contracted for. The case promises to be appealed to the United States Customs Court by domestic steel producers who import the alloy.

Aluminin is produced in the electric furnace and according to the treasury decision its approximate analysis is: Aluminum, 40 to 50 per cent; silicon, 35 to 40 per cent; iron, about 15 per cent.

In the course of the decision, prepared in the form of a communication to the Collector of Customs at New York, Commissioner of Customs E. W. Camp said: "While there does not seem to be any definite information in the record before the department as to the rela-

tive values of the aluminum, silicon and iron, the customs agent in charge at Chicago, in a letter dated June 20, 1924, stated that on the date of his letter aluminum was worth in the United States from 27c. to 29c. per lb. and that ferrosilicon containing approximately 50 per cent of silicon was worth approximately \$75 per ton. Based upon the values stated the aluminin represented by the analysis above given would be in chief value of aluminum and you are accordingly directed to assess duty upon aluminin, if in chief value of aluminum, under paragraph 374 of the tariff act, leaving the importers, if dissatisfied, to their remedy by protest."

Manganese Inquiry of Tariff Commission Is General

WASHINGTON, Sept. 27.—Misapprehension prevails, especially among consumers, as to the nature of the investigation the Tariff Commission has under way regarding the manganese situation. There is the impression that the inquiry is being made under provisions of the flexible section (Sec. 312), which gives the President power to increase or decrease duties by a maximum of 50 per cent. As has been stated in THE IRON AGE the present investigation is not being conducted under that section but under Sec. 318 which empowers the commission to conduct a general inquiry. It does not and cannot contemplate a report to the President or involve a change in the duty. Rather the inquiry contemplates a report to be made for the use of Congress. There will not be, as is required under Sec. 315, any public hearing.

Large Sales for Eight Months Reported At Foundry Equipment Meeting

CLEVELAND, Sept. 27.—Over three-quarters of the membership of the Foundry Equipment Manufacturers Association was represented at the regular fall meeting, which was held at the Hotel Cleveland, Tuesday, Sept. 20. Owing to the illness of Thomas W. Pangborn, Pangborn Corporation, Hagerstown, Md., president of the association, S. C. Vessy, W. W. Sly Mfg. Co., Cleveland, vice-president, occupied the chair.

The quarterly reports of business conditions given by the individual members reflected a spotty condition, coupled with the feeling that the volume of business would be satisfactory during the remainder of the year. Sales aggregating \$4,052,737 for the first eight months of 1927 were reported, compared with \$4,075,885 during the corresponding period of 1926, the difference between the two years being only half of 1 per cent.

A resolution was passed authorizing a change in the statistical reports of the association covering sales, shipments, etc., whereby in the future these reports will embody an index figure which will make possible more accurate comparisons between the current figures and those for previous periods.

In a resolution which was passed unanimously it is contended that the text of a pamphlet issued by the American Society of Mechanical Engineers, governing the award of the welding prizes, contains statements and illustrations inimical to the welfare of the foundry industry, together with assertions which are erroneous and misleading concerning the suitability of castings for machine parts and other forms of engineering construction. The resolution requests the American Society of Mechanical Engineers to withdraw its sponsorship from this prize contest in its present form.

John W. Hill, financial editor *Iron Trade Review*, Cleveland, spoke on "The Current Business Situation." After luncheon at the Hotel Cleveland a golf tournament was held at the Chagrin Valley Club.

Finland to Buy Rolling Stock

HAMBURG, GERMANY, Sept. 10.—The Finnish Government has allotted funds to the Finnish State railroads for the purchase of 32 locomotives, of which 21 are heavy freight type, 135 passenger cars and 970 freight cars and other equipment. Purchases will be made in two installments and tenders will be invited soon.

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This Issue in Brief

Simple system of production control synchronizes manufacturing, purchasing, stock-keeping, and cost records. Manifold record forms are used to excellent advantage by aluminum foundry in keeping track of material going through the plant, providing data for cost-finding, billing data, and stocks on hand.—Page 860.

To make good steel, keep the iron oxides in bath and slag as low as possible, says metallurgist. Declares that practically all ills of steel-making can be traced to the presence of oxygen in some form in the solidified product.—Page 862.

Price-cutting is defensible under some conditions, says trade counsellor. Among these conditions are, (1) eliminating unfair and weak competition, (2) holding old customers when they need help, and (3) carrying overhead.—Page 875.

Better business is forecast by rise in P-V Line. That a turning point in business is near at hand is indicated by Dr. Haney's barometer.—Page 884.

Purchasing agent receives a daily report of stocks on hand. Thus the danger of running short of a particular kind of material is eliminated, and the buying executive is enabled to arrange his buying schedule to the best advantage.—Page 858.

Denies that metallurgy is twenty years behind the other sciences. No one would make this assertion after witnessing operations in a modern plant, Doctor Langenburg asserts.—Page 860.

Don't bury important cost items under the catch-all of "overhead." If maximum value is to be obtained from trade association investigation of costs, average figures should be obtained on the costs of selling, engineering, estimating, etc., trade counsellor tells reinforcing steel jobbers.—Page 875.

Production delays, due to material shortages, are avoided by dividing stock bins into two compartments. Withdrawals are made from one compartment. When that is empty, an order is made to fill it, and materials are then drawn from the other compartment.—Page 871.

Has the use of silicon in structural steel passed the safety point? In German bridge building for railroad service the deflection allowed was formerly 1 in 2000. Now it is very near to 1 in 600, which may be dangerous, in view of the lack of knowledge on swaying under the rolling load. The suggestion is made that the silicon not exceed 0.50.—Page 883.

Record-breaking volume of retail trade is a bright spot on the business horizon. "It seems inevitable that so large a volume of consumer buying will take care of any troublesome inventories in the hands of manufacturers," Dr. Haney says.—Page 886.

Stronger anneal permits 66 per cent brass sheets to be drawn more deeply but crystal size is so large that the surface is rough. Thus smaller grains must be produced at the expense of some ease in working.—Page 877.

Milling cutters of standard high-speed steel, hardened by the open-fire method, are said to give the best results. Western Electric engineers use a recording watt meter in their tests. In the majority of cases the cutting efficiency of the tools increased from the first to the third, fourth or fifth grind.—Page 863.

Modern machine tools take less floor space. Exhibits at machine tool exposition reveal that the trend in machine tool design is toward greater compactness. The new tools are also heavier, more massive, and more powerful.—Page 872.

We are buying more iron and steel from foreign countries and selling less iron and steel to them. Export tonnage in August was 8 per cent under July, while imports gained 12 per cent. But our foreign customers are buying more of our machinery. We shipped more than 41 million dollars worth of machinery out of the country in August, a gain of 2 per cent over July.—Page 921.

In cold-forming pure aluminum a hold-down ring prevents buckling during the intermediate stages of the cupping operation. This ring grips the blank before the die approaches. It is necessary because of the high coefficient of friction against the dies.—Page 878.

High-speed steel tools should not be allowed to become cold before drawing, say metallurgists. This practice results in losses, especially in the case of large tools, they declare.—Page 864.

Doubles the life of cold-heading ball dies of plain carbon tool steel. Increasing the quenching temperature from 1470 to 1620 deg. Fahr., followed by a suitable tempering treatment, increases the fatigue resistance to or beyond the point where the dies wear or deform larger.—Page 864.

In deep drawing zinc sheets, the reduction in diameter from the blank must not be greater than 40 per cent. Subsequent draws must be limited to 20 per cent.—Page 877.

Why not hold all metal trades expositions in one city at one time? The suggestion that the Drop Forgers, Steel Treathers, Machine Tool Builders, and other associations in the industry, unite in a combined metal trades and machinery fair, has much to recommend it. Attendance would probably be increased, and cost to exhibitors would be lowered.—Page 893.

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Industrial Troubles and Prices

THE past few years have been marked by an absence of troubles affecting manufacturing. There have been no shortages of raw material, no transportation difficulties, no strikes of consequence and no labor shortage. For several years after the war the times were full of these things. In the depression of 1921 the question was asked privately in trade circles, "Where will trouble break out next?" In June, 1922, in the third month of the last bituminous coal strike, it was remarked that quite likely the strike was a blessing in disguise.

Sellers have found that it is hard to obtain profitable prices when there is no trouble. Volume has been large, costs have been reduced and earnings fail to reflect these obvious advantages.

Certainly some one profits when useful commodities are produced in large quantity at a minimum of expense and effort, but the manufacturers do not see that they are reaping the benefit.

One readily recalls the intense activity, under high pressure, that prevailed through most of 1920. It is hard to believe that we have done considerably more business this year, when the intensive effort to get materials that marked 1920 is replaced by intensive effort for orders. Yet such is the case. A comparison of figures representing important factors is as follows, showing percentage increases or decreases in this year to date from the same period of 1920:

Freight car loadings.....	+ 15 per cent
Steel ingot production.....	+ 10 per cent
Portland cement shipments.....	+ 72 per cent
Commodity prices	— 30 per cent
Population	+ 22 per cent
Steel Corporation earnings	+ 5 per cent

Instead of the car shortages and vexatious delays of 1920 we have large car surpluses and very expeditious movement. Steel production has increased slightly, Portland cement shipments greatly, and other manufacturing activities, in general, lie between. Commodity prices have had what seems like a great drop, if one considers only the figures. The big difference is made by the fact that

there were troubles then and there are no troubles now except the difficulty of securing earnings.

The population increase, however, ought to be considered. Often it is not. In the old days business activity fluctuated so widely that population changes did not count for much. Nowadays we measure everything much more closely. We make "records" by small margins and forget that this does not count for so much as the old record-breaking performances did.

In the above table there is a comparison of Steel Corporation earnings, not because they are typical but because they represent an exceptional case. The Steel Corporation held its prices down in 1920 and did not have so large earnings as other producers, whose figures would show decreases from 1920. The Steel Corporation's philosophy was that prices should be kept reasonable, but it has been impossible for the philosophy to be carried out lately, in the other direction, for steel prices have been below a reasonable level.

Thus these recent years of great activity and declining earnings present a problem. Smoothness, efficiency and economy in production are good for society. How can the producers secure their share of the benefit?

Hiring Smuggled Aliens

FROM the Department of Labor comes the practical suggestion that employers of labor insist that every alien applying for work be compelled to establish the legality of his entrance into the United States. The request is based on sound sense in more than one way. For one thing, as Secretary Davis points out, "there is too much unemployment in the country to allow aliens here illegally to hold positions when men and women entitled to live here are forced to go without." A more important reason still is the known fact that some of the most dangerous of immigrants, particularly those professing communist and other un-American doctrines, have been smuggled into the country, some of them to avoid the quota provisions of the immigration act, others because they fear recognition

and rejection on the ground that they are undesirable.

To give persons of this type employment is to offer them the very opportunity they are seeking, which is to spread their dangerous propaganda and stir up dissension and unrest. Their presence in an industrial plant is never for its good, and may have a serious disorganizing influence, particularly where a large part of the workers are foreign born and not sufficiently Americanized to be rid of prejudices which have been bred into their minds in the home country.

Some of the large establishments watch closely for signs of the presence of agitators, and when any such are discovered take prompt steps quietly to let them go. Secretary Davis is right in saying that any man worth hiring should be able to display proof that his entrance into the United States conformed with the laws, and his suggestion ought to prove workable as the proverbial ounce of prevention that is worth a pound of cure.

Bigger and Better Expositions

LAST week in Detroit were held meetings and exhibitions of several engineering societies. During the same days Cleveland entertained a noteworthy exposition of machine tools. Despite the obvious difficulties of reporting such a plethora of events so that divergent readers will all find something of interest we applaud the beginning of a movement which may happily culminate in a Grand Conclave of Metal Workers, held once a year in this or that industrial center. Our only criticism of last week's proceedings is on the fact that the exhibits were divided between two cities.

Germany has systematized the industrial fair in Leipzig, where traders have gathered at stated intervals for the last 800 years. In the years of economic recovery since the war, European machinery manufacturers have found these annual displays of prime importance to their sales efforts, and have patronized them to such an extent that a group of permanent buildings, equaling in size and number those on our most prosperous State fair grounds, have been erected at Leipzig to house the exhibits.

There is thus sound precedent for concentrating all the exhibitions of the metal trades in one city and in a relatively brief time—one, two, three weeks at most. The American plan of exhibiting in one city one year and in another city the next has a very real advantage over the German plan because a new and fresh audience is available. Over here a dozen customers and a hundred prospects will ride a hundred miles into a neighboring center for every one that would travel a thousand miles to some national fair grounds.

One might think that a combined metal trades and machinery fair would be impossible because no one city at present has an exhibition hall large enough to house the show. That is not so big an objection as might appear. Any one of a half a dozen leading cities has several adequate halls where the individual exhibitions might be held. Each display in this way could gain in individuality, comfort and compactness what might be lost in management and operating expense.

Assemble such a series of expositions with concurrent national meetings of their trade and techni-

cal associations, and the result would be in many respects happy. One such display would replace two or three others as now held. For each show thus eliminated manufacturers would be spared the large expense of freight, packing and erecting their exhibits (often consisting of heavy machines, furnaces, or other products), and the greater expense of travel, salary, maintenance, and derangement in routine work of salesmen and representatives. Furthermore it would doubtless increase the attendance of the participating societies. A man who belongs to many would not have to pick and choose the ones closest to his present interest—he would certainly be there at the one big show, and would save in time and expense correspondingly. The man of more specialized calling would be attracted because he surely could find some features in the combined programs worth his while—he would not lose by default the many advantages of getting in contact with new men and ideas.

Then, too, if the business organizations in these fields could meet during the same time, a stimulating contact could be had between managers and technicians. Gear Makers, Drop Forgers, Machine Tool Builders, Industrial Engineers, Metal Trades and Management associations (to mention a few which come to mind) have so many interests in common and enough overlap in membership to warrant gathering at such a time and place as would allow the members to profit by the cosmopolitan atmosphere. There might even come a day when the American Iron and Steel Institute would break the fixed habit of meeting in New York by traveling to another big city, which for the time would be concentrating on the problems of metal production and fabrication.

The Public Consents

ARTICLES in the *Wall Street Journal* have been drawing attention to the high cost of theatrical production, especially in the city of New York, owing to the exactions of unions, stage hands being the most aggravating, with the musicians a fair second. The opinion we form from these comments is that in arbitrarily fixing wage scales, prescribing rules to which employers must conform, and multiplying obligations so that several men must be employed for what could easily be done by one, the union of stage hands can give cards and spades to all other unions.

It is not many decades back that the price for the best seats in the best theaters was \$1.50. There are few now in New York where the price is not at least twice as much, while for a large class of productions it is \$5, plus 10 per cent Federal tax, and this year some producers are beginning to institute \$6 plus tax. The explanation offered is the need for increased revenue in order to pay the unions.

This gives, of course, only a superficial explanation. The work of stage setting is not one requiring any high order of natural skill or long apprenticeship. We fancy that a corporal's squad from any infantry regiment could become expert at it in a week or so. With ample free labor available, the theatrical managers are not the victims of a stranglehold, but rather are connivers in pursuing the easiest way. They can get what they want from the public and their mechanics can get what they want from them, and so on down. No one is

constrained to go to the theater at a cost of \$6, plus a 10 per cent tax, plus a premium of 10 to 50 per cent for a choice seat. The managers have some ground for grievance in that their initial venture is enhanced and their risk from a "flop" is consequently magnified, but of course they take that into account.

In cities outside of New York the prices for theater seats are lower, for the simple reason that customers will not pay so much as in New York. In Chicago the proprietors of motion picture houses recently closed them, making an issue with a union that was exorbitant and dictatorial. The explanation of the action of those managers was to be found in their appealing, at relatively low prices, to the multitude that will not patronize the theater if it has to pay much.

In brief, the theatrical unions are irritating, wasteful, and economically reprehensible. A squad of four men, for example, ought not to be salaried for the purpose of merely watching the flags with which a theater may be festooned in conformity with a union rule intended to "make" work. They ought to be hewing wood, drawing water, digging ditches or doing something else productively. It is, however, the law of supply and demand that prevails and controls, and in this industry the demand being strong, there being a sellers' market, at least in the big cities, there is no fault to be found by anybody except theorists. It is not at all like approaching the plumber, with due subservience, when your house drain is stopped. But, seriously, much of the extortion of which we like to talk occurs for the reason that the public consents.

However, in the Chicago instance the managers finally surrendered and agreed to continue to employ four men to do the work for which two were amply sufficient; and the union leaders boasted that they would have called out their henchmen in every city of the land, depriving the people of their amusements, which would have been a dreadful thing! Yet even this implies that the public consents.

Value of Coke and By-Products

FIGURES compiled by the Bureau of Mines from reports of the by-product coke producers raise the question, Who or what fixes the value of coke? The final coke statistics for 1926, issued this week, put the total "value" of by-product coke produced in 1926 at \$250,748,533, on 44,376,586 net tons, while the "value" of the coal charged was \$247,170,284, on 63,646,610 net tons. Apparently the coke was worth only 1.4 per cent more than the cost of the coal.

The market value of beehive coke could not have been the criterion. The average value of the by-product coke was \$5.65, while the average value of beehive coke produced in the year was \$4.57. The two are not comparable, because the bulk of the by-product coke is at point of consumption, the coal having paid the freight, while beehive coke, at the values reported, has to pay freight. Only 12,488,951 tons of beehive coke was produced, or but 28 per cent of the total of by-product coke. Apart from other considerations, the quantity was too small to determine the value of coke in general.

The principal by-products sold had a total value of \$134,223,739, made up of \$64,686,800 in surplus

gas, \$14,103,760 in tar, \$28,128,203 in ammonium sulphate or equivalent, and \$27,304,976 in crude light oil and derivatives. The "surplus gas" is all outside that used in heating retorts, nearly half the total value being represented by gas used in affiliated plants, chiefly steel plants.

In addition to the regular coke and the by-products, there was 3,085,770 tons of screenings and breeze, valued at \$5,595,796, used by the operators, and 936,292 tons, valued at \$3,281,676, sold.

The reported items, coke, breeze and by-products, totaled \$393,849,744. The regular coke constituted 63.7 per cent of this total. The value of the coal as reported was 62.8 per cent of the total realization.

From the alinement of these figures it is quite clear that the by-product coke producer, when identical with a blast furnace operator, has a wide latitude as to what shall be assigned as the value of the coke consumed and what shall be assigned as the cost of the by-products and gas sold. It is a matter of how the profits of the whole operation shall be allocated.

This is a delicate subject with many merchant blast furnace operators, who for a long time past have felt that steel companies were underselling them in the merchant pig iron market, through their advantage in having by-product operations.

The actual competitive position would not, of course, be vitally affected by the accounting system used. The steel company might charge itself with a high price for its coke, thereby writing a large profit on the coke, and still sell its pig iron cheap on the basis of telescoping its profits, or losing on pig iron for the sake of profiting on the coke. If it lost on the coke and profited on the by-products the case would be the same in the long run, and would not necessarily affect the marketing policy on the pig iron sold by the steel company.

CORRESPONDENCE

Engineering Opportunities

To the Editor: Many an engineer deserving of a better fate and fitted for a greater responsibility continues in a routine engineering capacity, because he has become so absorbed in the technique of his profession that he has unconsciously become one of the vast army who are placidly waiting for opportunity to knock. He believes that some day his chance will come seeking him out, yet it is a well established fact that for the many a real opportunity never knocks, while for the few who have the initiative to seek opportunity knocks not once but many times—each time with a greater prospect for the man who is alert enough to envisage the possibilities when he opens the door. Real opportunities do not come as the result of a "help wanted ad," but rather as the reward for the man who properly prepares himself and then seeks them out and recognizes them when found.

An engineering training, both in education and practice, is the best foundation on which to build that any man can acquire. To that must be added a practical knowledge of shop processes and problems, an appreciation of the importance of proper financing for an organization, and an intelligent understanding of the advertising, selling and marketing problems. It is not necessary that the ambitious engineer master all of these in their full detail and many ramifications, but he should have a general working knowledge and practical understanding of their basic necessity for the success of any undertaking.

He should by all means keep abreast of the technical developments of his particular line of endeavor, but he should avoid the mental frame of mind wherein he grows to believe that his profession is the alpha and omega of success in any endeavor. To develop a pleasing personality and an ability to discuss any current trend in industrial affairs in its broadest aspects is distinctly worth while.

Armed with this knowledge, he can unostentatiously interview a prospective employer, as well as be interviewed by him. He is then in a better position to sell himself to the man who has a real opportunity to offer him, as well as to avoid the pitfall unwittingly set for him by the enthusiast who has greater faith in the prospects of a new undertaking than the facts warrant.

The prospective employer who has a bona fide opportunity open has a greater appreciation of the man

who has sufficient self-interest to inquire about the financing of the company, the market for its products and its production facilities. This knowledge, properly used, will keep him from giving the best years of his life to an industrial organization that can never amount to much, because it is not properly grounded on sound business principles.

Finally, it is the ability to look beyond the technical phases of a proposition, and appreciate the business aspect of it, that gives the engineer an opportunity to become a real executive. It is in this way that he offers his greatest contribution to progress, attains the biggest monetary return for himself, and fully justifies the investment represented by his engineering education.

JOHN F. HARDECKER.

Philadelphia.

Rebates Offered British Steel Buyers

Effort of Local Steel Makers to Obtain Better Share of Orders
—Would Affect Mainly the Continental Works

WASHINGTON, Sept. 24.—Effective Sept. 1, British manufacturers who have signed the agreement for steel rebates to consumers who use only material of British origin will allow reductions explained in the following statement:

The heavy steel industry of the United Kingdom has, almost without exception, since the termination of the Great War, been struggling against the greatest difficulties, chief among which was the continuously increasing pressure of foreign competition, aided as it was by longer working hours and lower wages of Continental workmen, subsidies to Continental makers by their Government, especially designed to aid exports, low railroad rates, negligible social service costs, low rates and low taxation, and depreciating exchanges, in comparison to which the heavy steel makers of the United Kingdom were faced by a high standard of living which necessitated high wages and comparatively short hours of work for their operatives, together with greatly increased charges for transport and social services, which exceeded what was paid for these charges in 1913 by about 230 per cent.

Evidence of these handicaps is shown by the fact that imports of iron and steel into this country are rapidly increasing. In 1923 the figure was £14,000,000; in 1924, £22,000,000; in 1925, £24,000,000; in 1926, £29,000,000; and for 1927, on figures already in hand, the total for the year if not checked may easily be £50,000,000.

The following contract has been signed by 28 steel producers of the United Kingdom:

The unnamed steelmakers beg to inform all consumers of steel in Great Britain, Northern Ireland, and the Irish Free State, that on and after the date hereof (Sept. 1, 1927) they will grant a rebate on the material specified below, delivered to such consumers against sales, whether made to consumers direct or through merchants, on and after the said date, subject to the provisions of the circular. The rebate to be at the rate of 7s. 6d. [\$1.82] per ton on joists and 5s. [\$1.21] per ton on all the other defined materials.

Ordinary quality steel plates for all purposes (including welding and flanging quality, if not for boilers), $\frac{1}{2}$ in. thick and up.

Ordinary quality steel sections namely: Angles, tees, channels, bulb angles, bulb tees, plain bulbs, zed bars, joists (all sizes), rounds, squares, hexagons (3 in. and up), flats (over 5 in. wide).

Where a consumer has had delivered direct from one of the said makers' works any of the said defined materials purchased from a merchant, the rebate shall be paid to such consumer, who will require to claim from the maker direct.

The rebate cannot be made to a merchant other than a recognized stockholding merchant, and then only on material from the warehouse stock of such stockholding merchant.

Any consumer who has purchased material from a merchant and is claiming rebate will be required to

give proof of origin by quoting date and number of makers' invoice, and this information must be obtained by such consumer from the merchant.

In respect to joists, subject to the acceptance by the consumer or stockholder of the rebate arrangement, the following special additional rebate allowances will be made:

Any buyer may specify against an order or contract for plain joists without workmanship thereon (but same may be painted or oiled at the regulation extra) in stock lengths—namely, equal feet cut to a margin of 2 in. over and under, or 4 in. over and nothing under, or 4 in. under and nothing over, in not less than 20-ton lots of one section in one specification on one day, at a rebate of 1s. per ton. For a specification of 50 tons or more of one section complying with the above conditions, a further rebate of 1s. 6d. per ton will be allowed, making 2s. 6d. per ton. For a specification of 100 tons or more of one section complying with the above conditions, a further rebate of 2s. 6d. per ton will be allowed, making 5s. per ton.

The rebate will be payable by each of the several unnamed makers to his own consumer on the actual weight delivered, subject to all current contracts with any of the unnamed makers being carried out by the consumer in accordance with the terms thereof.

The rebate will become due in the fourth month following delivery, and will be payable after receipt of the consumer's cheque for material delivered in the previous month.

The payment of rebate will always be for the deliveries made during the first month of the period kept in hand.

The makers' names are:

Appleby Iron Co., Barrow Hematite Steel Co., William Beardmore & Co., Bolckow, Vaughan & Co., Cargo Fleet Iron Co., David Colville & Sons, Consett Iron Co., Dorman, Long & Co., James Dunlop & Co., Earl of Dudley's Round Oak Works, Frodingham Iron & Steel Co., Guest, Keen & Nettlefolds, Robert Heath, Low Moor, Alfred Hickman, Lanarkshire Steel Co., Lillieshall Co., Palmers Shipbuilding & Iron Co., Park Gate Iron & Steel Co., Partington Steel & Iron Co., Patent Shaft & Axletree Co., Pease & Partners (Skinninggrove Works), Port Talbot Steel Co., Redheugh Iron & Steel Co., Shelton Iron, Steel & Coal Co., South Durham Steel & Iron Co., Steel Company of Scotland, Stewarts & Lloyds, Samuel Tyzack & Co.

A. O. Smith Corporation, Milwaukee, is shipping 5625 tons of electrically welded steel pipe to the Dixie Pipe Co. This will be used for a 22-in. gas line from the Shreveport area to Houston and Port Arthur, Tex., a distance of 278 miles. The A. O. Smith pipe mill is now producing this new electrically welded pipe at the rate of 4 miles a day.

Iron and Steel Markets

Bookings Show Slight Upturn

Buyers, However, Remain Cautious — Rate of Production

Unchanged — Progress in Price Stabilization —

Pig Iron Quiet, Scrap and Fuel Weak

WHILE not the experience of all companies, bookings in the last days of September are putting this month somewhat ahead of August. The volume is not sufficient to require expanded operations; these remain substantially the same as a week ago—about 60 per cent of capacity at both Pittsburgh and Chicago.

What increased activity has become evident on the turn into the fourth quarter shows no change in the cautious covering of consumers for a few weeks' needs, and mills are required to revise rolling schedules sometimes in three and four-day periods.

Prices are showing surprising firmness in view of the difficulties in piling up orders. Scarcity of lots large enough to encourage aggressive competition may explain the fewer irregularities, but at the moment stabilization is the watchword, with results in the East of advances in plates and shapes from the low levels recently prevailing. In Chicago a spread of \$3 a ton over Pittsburgh is being tested on the ordinary sales of the heavy tonnage products, but a \$2 differential is likely on attractive orders.

Well sustained demand for structural steel and continued activity of agricultural implement makers help to balance the backwardness of other major consuming industries. A turn for the better in the wire trade is due wholly to buying by jobbers. The South and Southwest have increased their buying of galvanized sheets.

Additions of 30,000 tons have been made to the pending business in fabricated steel, and they include 10,000 tons for a city hall in Buffalo and 4000 tons for a bridge at Bristol, R. I. A James River bridge connecting Norfolk and Newport, Va., calls for 6400 tons of shapes and 2000 tons of bars. A Pennsylvania Railroad bridge, soon to be built over Newark Bay, will take 11,000 tons of steel.

The railroad equipment trade, for many weeks at a point of stagnation, is enlivened by the prospect that the Pere Marquette may buy 500 to 1000 box cars. A packing company is inquiring for 200 refrigerator cars. As with the 450,000 tons of rails expected to be covered in the next fortnight, the car business would not be reflected in output for six to eight weeks.

In rails, definite inquiries are for 15,000 tons, and in track fastenings, for 35,000 kegs of spikes, 14,000 kegs of bolts and 8000 tons of tie plates.

A new quantity-price development is a plan to name current quotations on hot-rolled strip steel to consumers who have not used over 5000 tons in the past year. A reduction of as much as \$3 a ton is proposed to users of 10,000 to 25,000 tons, and such further concession to still larger buyers as compe-

tition dictates. As most users take less than 5000 tons, it will be the few, mostly in the automobile field (which takes the bulk of the total production), who will get the lower prices. These would be slightly above the lowest obtaining early this year.

Concessions of \$2 a ton have appeared in the last few days in black sheets, but the unsettled price situation revolves chiefly about the three-cornered competition of hot rolled strips, light plates and the narrower blue annealed sheets.

Pig iron buying, on the eve of a new quarter, is unusually light. In the Central West considerable iron will be carried over on third quarter contracts. Fresh price weakness has developed in New England, and in the Valleys surplus stocks of steel company blast furnaces are a disturbing factor. Merchant furnaces at Buffalo, with fairly comfortable backlogs, are now able to take a stronger position.

Scrap is weak throughout the country, reflecting the reduced demands of steel works and other consumers. At Cincinnati and St. Louis heavy melting steel has declined 25c. and 50c. a ton, respectively.

The approach of cold weather has failed to develop any strength in the fuel market, the coal strike notwithstanding.

August exports of iron and steel products, at 175,636 tons, fell below the 190,502 tons of July but were above the 171,588 tons of August, 1926. For eight months, exports are ahead of last year by 103,000 tons, or 7½ per cent.

Imports of iron and steel increased 12 per cent to 68,386 tons in August, but were far below last year's August receipts of 91,578 tons. For the eight months the total has fallen from 785,575 tons to 513,430 tons, due to a drop in pig iron imports from 376,000 tons to 85,280 tons.

For the first month in more than four years, more than 300,000 tons of iron ore came into American ports in August. Imports of the first eight months totaled 1,879,180 tons, against 1,741,982 tons to Aug. 31, 1926.

Machine tools exported from the United States in the first eight months of 1927 were valued at \$7,395,474, a gain of 53 per cent over the \$4,835,346 of last year's first eight months.

Germany's August output of steel was close to a 17,000,000-ton annual rate, making a post-war record.

After holding for two weeks the lowest level since 1916, THE IRON AGE pig iron composite price has advanced to \$18.09, from \$18. It was \$19.46 one year ago. The finished steel composite price remains at 2.346c. a lb. for the second week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sept. 27, 1927	Sept. 20, 1927	Aug. 30, 1927	Sept. 28, 1926
No. 2, fdy., Philadelphia...	\$20.26	\$20.26	\$20.76	\$21.76
No. 2, Valley furnace....	17.50	17.50	17.50	18.00
No. 2, Southern, Cin'ti....	20.94	20.94	20.94	23.69
No. 2, Birmingham.....	17.25	17.25	17.25	20.00
No. 2 foundry, Chicago*...	19.50	19.50	19.50	21.00
Basic, del'd eastern Pa....	20.00	20.00	20.00	20.75
Basic, Valley furnace....	17.00	17.00	17.25	17.50
Valley Bessemer, del'd P'gh	19.76	19.76	19.76	20.26
Malleable, Chicago*.....	19.50	19.50	19.50	21.00
Malleable, Valley.....	17.50	17.50	17.50	18.00
Gray forge, Pittsburgh...	18.76	18.76	18.76	19.26
L. S. charcoal, Chicago...	27.04	27.04	27.04	29.04
Ferromanganese, furnace.	90.00	90.00	90.00	88.00

Rails, Billets, etc., Per Gross Ton:	Sept. 27, 1927	Sept. 20, 1927	Aug. 30, 1927	Sept. 28, 1926
O.-h. rails, heavy at mill.	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh..	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	36.00
Forging billets, P'gh....	39.00	39.00	39.00	40.00
O.-h. billets, Phila.....	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh....	43.00	43.00	43.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.75	1.75	1.80	1.90

Finished Iron and Steel,	Sept. 27, 1927	Sept. 20, 1927	Aug. 30, 1927	Sept. 28, 1926
Per Lb. to Large Buyers: Cents	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.07	2.07	2.12	2.22
Iron bars, Chicago.....	1.90	2.00	2.00	2.00
Steel bars, Pittsburgh....	1.75	1.75	1.80	2.00
Steel bars, Chicago.....	1.90	1.90	1.90	2.10
Steel bars, New York....	2.09	2.09	2.14	2.34
Tank plates, Pittsburgh..	1.75	1.75	1.80	1.90
Tank plates, Chicago.....	1.90	1.90	1.90	2.10
Tank plates, New York...	2.09	2.04	2.09	2.24
Beams, Pittsburgh.....	1.75	1.75	1.80	2.00
Beams, Chicago.....	1.90	1.90	1.90	2.10
Beams, New York.....	2.09	1.95	1.95	2.34
Steel hoops, Pittsburgh...	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Sept. 27, 1927	Sept. 20, 1927	Aug. 30, 1927	Sept. 28, 1926
Per Lb. to Large Buyers: Cents	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	3.00
Sheets, black, No. 24, Chi-				
cago dist. mill.....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh.	3.85	3.85	3.85	3.85
Sheets, galv., No. 24, Chi-				
cago dist. mill.....	3.95	3.95	3.95	3.95
Sheets, blue, 9 & 10, P'gh.	2.25	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chi-				
cago dist. mill.....	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh....	2.55	2.55	2.55	2.65
Wire nails, Chicago dist.				
mill.....	2.60	2.60	2.60	2.70
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist.				
mill.....	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh..	3.25	3.25	3.25	3.35
Barbed wire, galv., Chi-				
cago dist. mill.....	3.30	3.30	3.30	3.40
Tin plate, 100 lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:	Sept. 27, 1927	Sept. 20, 1927	Aug. 30, 1927	Sept. 28, 1926
Heavy melting steel, P'gh.	\$15.50	\$15.50	\$15.50	\$17.50
Heavy melting steel, Phila.	14.00	14.00	14.00	16.50
Heavy melting steel, Ch'go	12.25	12.25	12.00	13.50
Carwheels, Chicago.....	13.75	14.25	14.50	15.25
Carwheels, Philadelphia..	15.50	15.50	15.50	17.50
No. 1 cast, Pittsburgh....	15.00	15.00	15.00	16.25
No. 1 cast, Philadelphia..	16.50	16.50	16.00	17.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.75	16.50
No. 1 RR. wrot, Phila....	15.50	15.50	15.50	17.50
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	11.50	13.50

Coke, Connellsville, Per Net Ton at Oven:	Sept. 27, 1927	Sept. 20, 1927	Aug. 30, 1927	Sept. 28, 1926
Furnace coke, prompt....	\$2.85	\$2.85	\$3.00	\$3.50
Foundry coke, prompt....	4.00	4.00	4.00	4.50

Metals,	Sept. 27, 1927	Sept. 20, 1927	Aug. 30, 1927	Sept. 28, 1926
Per Lb. to Large Buyers: Cents	Cents	Cents	Cents	Cents
Lake copper, New York...	13.25	13.25	13.25	14.50
Electrolytic copper, refinery	12.90	13.00	13.00	14.00
Zinc, St. Louis.....	6.20	6.22 1/2	6.25	7.35
Zinc, New York.....	6.55	6.57 1/2	6.60	7.70
Lead, St. Louis.....	6.00	6.00	6.30	8.40
Lead, New York.....	6.25	6.25	6.60	8.75
Tin (Straits), New York...	58.75	61.50	63.50	71.00
Antimony (Asiatic), N. Y.	10.50	11.00	12.00	14.25

Pittsburgh

Steel Market Feels Lack of Demand from Railroads and Motor Car Builders

PITTSBURGH, Sept. 27.—The steel market is so lacking in activity that some manufacturers are going back to 1921 to find a comparable condition and a few say that the market then was more active than it is now. Structural steel lettings are not decreasing to any marked extent and reports from the agricultural implement industry indicate operations only a little below full capacity, but the other major consuming industries are doing poorly, if their purchases of steel are a criterion. Mill activities in this and nearby districts are still slipping, and this is reflected in ingot production, which is hardly 60 per cent of capacity. That estimate is commonly made, but it is probably based on "practical," rather than "theoretical," capacity.

Manufacturers are growing less sanguine as to the prospects for the remainder of the year. The recession in general business that began to develop as long ago as last May has begun to be reflected in increasing unemployment in many of the large industrial centers of the country, and the consequent impairment of earnings and spending power is now cited as the probable reason why motor cars are not selling more rapidly and why the builders are not heavier purchasers of steel. The railroads do not seem to need cars, and the steel makers really need both railroad and automotive business to supplement that coming from other directions.

The outstanding price developments of the week are the introduction by the makers of hot-rolled strips of a new price-making method, whereby the amount of tonnage taken by the individual buyer governs the price, and the fact that makers of bars, plates and shapes have not yet been able to place the small-tonnage buyers on a price of 1.85c., Pittsburgh. The strip steel price plan provides that those whose takings over the past year have not been 5000 tons shall pay the base prices, while there is a deduction of \$2 a ton for those who have taken out from 5000 to 10,000 tons and \$3 for takers of 10,000 to 25,000 tons. For those who have taken more than 25,000 tons the price is to be determined by competition. Complete adoption of the plan is yet to be made.

There is no more strength to prices of steel products than there usually is in a market as dull as the present one, and real fourth quarter prices on those lines sold on a quarterly basis are yet to crystallize.

The primary materials remain dull and are not any too steady in price. Warm weather has slowed up the demand for household coal, and industrial consumers are too well supplied for their present needs to have much need for additional supplies. Meanwhile, production is increasing and the market is weakening under the efforts of producers to find a market. A good many more steel companies than ordinarily are credited with having iron for sale have surplus supplies that may reach the market, barring an early improvement in the demand for steel. Several steel works are producing more iron than they can use.

Pig Iron.—An otherwise dull and uninteresting market has been slightly enlivened by an inquiry from the Westinghouse Electric & Mfg. Co. covering the re-

quirements of its Trafford, Pa., foundry for the final quarter of the year. The inquiry asks for prices on several grades of iron, but specifies no definite tonnage. Sales of one merchant producer for the month have been only 1000 tons, and of another only 3000 tons, and new business of all makers has been of very moderate proportions. A Greensburg, Pa., melter bought 1000 tons of No. 1 foundry iron and was able to better the Valley furnace price by about 25c. per ton, due to a splitting of the difference between the freight charges from the company which sold the iron and the rate from the Valley. There is no occasion to change Valley iron prices, but the market is not really strong at present levels, for while strictly merchant furnace production is low, there remains a possibility that the steel companies will find it necessary to go after iron business to keep their active furnaces in blast.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Low phosphorus, copper free.....	27.50

Freight rate to the Pittsburgh or Cleveland districts, \$1.76.

Ferroalloys.—There is no new buying of the commonly used ferroalloys worthy of notice. The dullness is intensified by the fact that steel works operations are decreasing and specifications against contracts are for the minimum quotas, and these in some cases have to be solicited. Prices are steady, because it is not believed lower ones would create demand.

Semi-Finished Steel.—The notable feature of the market is its steadiness in the face of a very slow demand. Sheet, tin plate and strip makers are all operating at a low rate, and those who do not make their own steel have some crude steel in stock and are not obliged to make large fresh purchases. Since lack of demand merely represents a lack of requirements, there is no disposition by makers of billets, slabs and sheet bars to force sales. Skelp is not particularly active, nor are users of wire rods pressing mills to make shipments. Not many rods have been sold at today's price of \$43, base Pittsburgh or Cleveland, but some makers are said to be considering cancellation of lower-priced supplies that are not ordered out by the end of this month on third quarter contracts.

Wire Products.—Nail business is slow, but demand is at least holding its own in the other wire products. In the South and in the Northwest, the more prosperous condition of the farmers is helping sales of fence and fencing materials. Demand for plain wire would be better if the motor car builders were busier, since a considerable tonnage is represented in the takings of cold-headed products and springs, made from wire, by the motor car industry. At the beginning of the third quarter wire manufacturers quite generally adopted a plan of writing contracts with jobbers for ninety days instead of sixty days, and most nail contracts now in effect do not expire until the end of this month. Jobbers are not seeking manufacturers, nor the latter the jobbers, on fourth quarter contracts, and for that

reason the nail price is not clearly defined. Manufacturers have been quoting \$2.55, base per keg, Pittsburgh, for bright nails for three months, but \$2.50 is as high as any have moved from the mills in that time.

Rails and Track Supplies.—An award of the Pennsylvania Railroad rails for 1928 delivery will be made late this week or the fore part of next week, since bids must be in by Sept. 29. Current demands for track accessories are still light, and the recent practice of buying on a monthly basis probably means that formal contracting will not be heavy this fall. Light rails are not moving with much freedom, but prices are holding.

Tubular Goods.—The recent action of the City Council of Denver in passing an ordinance making possible the entrance of natural gas into that city from Amarillo, Tex., brings nearer an award of the pipe for a line to run between the two points. The main line, which will be 22-in. pipe, will be 378 miles long, and there will be about 20 miles of smaller sizes for feeder lines. The pipe is yet to be placed. Pipe makers still report a steady demand for butt welded pipe, but that it is no tax upon productive capacity, which in recent years has increased materially. The best that can be said of the demand for oil country pipe is that it is no worse than it has been. Boiler tubes and mechanical tubing are only moderately active. There is some irregularity in prices, but no such weakness as might be expected in ordinary cases where the productive capacity so greatly exceeds consumption. Since the close of the World War seamless pipe and tube-making capacity has risen from 200,000 tons to close to 1,000,000 tons annually and welded pipe-making capacity has gained by fully 35 per cent.

Sheets.—Business still leaves much to be desired from the standpoint of volume, and the point is made that until there are heavier takings by the motor car builders and body makers, there is little likelihood that users of other finishes will depart much from a close-to-requirement buying policy. The mills cannot get very far behind their orders so long as the requirements for motor cars are subnormal, and the mills must begin to extend delivery promises before there can be much anticipation of demands. Mills here and in the Youngstown district insist that there is no weakening in prices and say that sales reported from the East of black sheets at less than 3c., base Pittsburgh, refer to tin mill black plates and that blue annealed sheets at 2.15c. are the narrow product of stripsheet mills. A local company reports an order for 1200 tons of blue annealed sheets, No. 16 gage, 48 in. wide, at the full base of 2.25c., Pittsburgh. Mill operations still average about 65 per cent of capacity.

Tin Plate.—General line tin plate requirements, supplemented by some scattered orders for packers' can sizes, are providing a mill operation of approximately 65 per cent of capacity, but the market as a whole lacks activity, since it is too early for much interest in 1928 supplies. Prices are merely steady, as there are a good many makers who need orders, and preferentials are being given to buyers who hardly would get them if the mills were more fully engaged. Weakness in the pig tin market is not conducive to firmness, since it

THE IRON AGE Composite Prices

Finished Steel

Sept. 27, 1927, 2.346c. a Lb.

One week ago.....	2.346c.
One month ago.....	2.367c.
One year ago.....	2.439c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.	Jan. 4:	2.339c.	Apr. 26
1926	2.453c.	Jan. 5:	2.403c.	May 18
1925	2.560c.	Jan. 6:	2.396c.	Aug. 18
1924	2.789c.	Jan. 13:	2.460c.	Oct. 14
1923	2.824c.	Apr. 24:	2.446c.	Jan. 2

Pig Iron

Sept. 27, 1927, \$18.09 a Gross Ton

One week ago.....	\$18.00
One month ago.....	18.13
One year ago.....	19.46
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	\$19.71,	Jan. 4:	\$18.00,	Sept. 13
1926	21.54,	Jan. 5:	19.46,	July 13
1925	22.50,	Jan. 13:	18.96,	July 7
1924	22.88,	Feb. 26:	19.21,	Nov. 3
1923	30.86,	Mar. 20:	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Chicago.....	1.90c.
Del'd Philadelphia.....	2.07c. to 2.17c.
Del'd New York.....	2.09c. to 2.19c.
Del'd Cleveland.....	1.94c.
F.o.b. Cleveland.....	1.75c.
F.o.b. Birmingham.....	1.95c. to 2.05c.
C.I.F. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.
Billet Steel Reinforcing	
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Birmingham.....	1.95c. to 2.05c.
Rail Steel	
F.o.b. mill.....	1.65c. to 1.75c.
F.o.b. Chicago.....	1.90c.

Iron

Common iron, f.o.b. Chicago.....	1.90c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.07c. to 2.12c.
Common iron, del'd New York.....	2.09c. to 2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Chicago.....	1.90c.
F.o.b. Birmingham.....	1.90c. to 2.00c.
Del'd Cleveland.....	1.94c.
Del'd Philadelphia.....	2.07c. to 2.12c.
Del'd New York.....	2.09c. to 2.14c.
C.I.F. Pacific ports.....	2.30c. to 2.40c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Chicago.....	1.90c.
F.o.b. Birmingham.....	1.90c. to 2.00c.
Del'd Cleveland.....	1.94c.
Del'd Philadelphia.....	2.07c. to 2.17c.
Del'd New York.....	2.09c. to 2.19c.
C.I.F. Pacific ports.....	2.35c. to 2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh.....	2.30c.
All gages, 6 in. to 12 in., P'gh.....	*2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net.....	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net.....	2.40c.
All gages, narrower than 6 in., Chicago, 2.40c. to 2.60c.	
All gages, 6 in. and wider, Chicago, 2.20c. to 2.50c.	
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Atlantic ports.....	\$1.21
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Gulf ports.....	\$1.20

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.10c. to 2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh.....	3.25c.
Strips, under 12 in., 1 up to 3 tons, Cleveland.....	3.25c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago.....	3.55c.
Strips, under 12 in., 1 up to 3 tons, Worcester.....	3.40c.
Stripsheets, 12 in. and wider, Pittsburgh mill.....	3.00c.
Stripsheets, 12 in. and wider, Cleveland mill.....	3.00c.
Stripsheets, 12 in. and wider, del'd Chicago.....	3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Gal'd wire, No. 9.....	3.00
Gal'd wire, gal'd.....	3.25
Barbed wire, painted.....	3.00
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh.....	2.15c. to 2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.35c.
Nos. 9 and 10, del'd Philadelphia.....	2.47c. to 2.57c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.40c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	3.00c.
No. 24, f.o.b. Ch'go dist. mill.....	3.10c.
No. 24, del'd Philadelphia.....	3.22c. to 3.32c.
No. 24, f.o.b. Birmingham.....	3.15c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	4.15c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.95c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.85c.
No. 24, f.o.b. Chicago dist. mill.....	3.95c.
No. 24, del'd Philadelphia.....	4.17c.
No. 24, f.o.b. Birmingham.....	4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill.....	3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.25c.
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Long Ternes

No. 28, 8-lb. coating, f.o.b. mill.....	4.20c. to 4.30c.
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Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.....	5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.40	25-lb. coating I.C. \$17.30
15-lb. coating I.C. 14.45	30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80	40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series	Numbers	Base Per 100 Lb.
21.00* (1/2% Nickel, 0.10% to 0.20% Carbon)		\$2.90 to \$3.00
2300 (3 1/2% Nickel)		4.10 to 4.20
2500 (5% Nickel)		5.00 to 5.25
3100 (Nickel Chromium)		3.10 to 3.20
3200 (Nickel Chromium)		4.75 to 5.00
3300 (Nickel Chromium)		6.75 to 7.00
3400 (Nickel Chromium)		6.00 to 6.25
5100 (Chromium Steel)		3.10 to 3.20
5200* (Chromium Steel)		7.00 to 7.50
6100 (Chrom. Vanadium bars)		4.10 to 4.30
6100 (Chrom. Vanad. spring steel)		3.60 to 3.80
9250 (Silicon Manganese spring steel)		3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)		4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.10 to 4.30
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.10 to 3.20
Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2 1/2-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	\$36.00 to 38.00

Track Equipment

Base per 100 Lb.

Spikes, 3/4 in. and larger.....	\$2.80 to \$2.90
Spikes, 1/2 in. and smaller.....	2.80 to 3.00
Spikes, boat and barge.....	3.10
Tie plates, steel.....	2.35
Angle bars.....	2.75
*Track bolts, all sizes, per 100 count, 70 per cent off list	

*Chicago mill prices on large track bolts are shown in Chicago market report.

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1/4	45	19 1/2	1/4 to 3/8	+11	+39		
1/2 to 3/4	51	25 1/2	1/2	22	2		
1/2	56	42 1/2	3/4	28	11		
3/4	60	48 1/2	1 to 1 1/2	30	13		
1 to 3	62	50 1/2					

Lap Weld

2	55	43 1/2	2	23	7
2 1/2 to 6	59	47 1/2	2 1/2	26	11
7 and 8	56	43 1/2	3 to 6	28	13
9 and 10	45	32 1/2	7 to 12	26	11
11 and 12	53	40 1/2			

Butt Weld, extra strong, plain ends

1/4	41	24 1/2	1/4 to 3/8	+19	+54
1/4 to 3/8	47	30 1/2	1/2	21	17
1/2	53	42 1/2	3/4	28	12
3/4	58	47 1/2	1 to 1 1/2	30	14
1 to 1 1/2	60	49 1/2			
2 to 3	61	50 1/2			

Lap Weld, extra strong, plain ends

2	53	42 1/2	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	15
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1 1/2 points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2 1/2%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2 1/4 in.....	27
2 1/2 to 2 3/4 in.....	37
3 in.....	40
3 1/2 to 3 3/4 in.....	42 1/2
4 to 13 in.....	46
1 1/2 in.....	+18
1 3/4 to 1 1/2 in.....	+8
2 to 2 1/4 in.....	2
2 1/2 to 3 in.....	7
3 1/4 to 4 1/2 in.....	9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	60	3 in.....	45
1 1/4 to 1 1/2 in.....	52	3 1/4 to 3 1/2 in.....	47
1 1/2 in.....	36	4 in.....	50
2 to 2 1/4 in.....	31	4 1/2, 5 and 6 in.....	45
2 1/2 to 2 3/4 in.....	39		

Hot Rolled

2 and 2 1/4 in.....	37	3 1/4 and 3 1/2 in.....	55
2 1/2 and 2 3/4 in.....	45	4 in.....	56
3 in.....	51	4 1/2, 5 and 6 in.....	51

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base.....	55
Carbon, 0.30% to 0.40%, base.....	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

has been the strength of that commodity, rather than of sheet bars, that has kept up the price of tin plate.

Cold-Finished Steel Bars and Shafting.—Business is still slow, although makers have had a fair measure of success in lining up fourth quarter business with small users at 2.20c., base Pittsburgh. It is said that 2.10c., base, is a preferential price extended to only one or two large tonnage buyers in Detroit.

Bars, Plates and Shapes.—The effort to put the small-tonnage buyers on a 1.85c. basis has not been successful. Indeed, not a few makers have found it difficult to interest this class of buyers at 1.80c., since, with the knowledge that there is a lower price to large consumers, they are disposed to preempt the right to decide what is a large and small tonnage. Lacking sufficient business with which to back up a firm price stand, the mills generally have yielded, and 1.75c., base Pittsburgh, is the general market on all three products and 1.80c. appears to be all that can be obtained for the carload, or smaller, tonnages. Steel fabricators who have been paying 1.80c. can now secure steel at 1.75c., and some mills have written down 1.80c. orders to the lower figure. Fabricating shops in this district are fairly busy, but new business is not developing as fast as old orders are being completed. Shipments of plates are exceeding new orders. Important bar consumers are still running at a low rate because of the light demand from the railroads and the railroad car builders. Refined iron bars are still quoted at 2.75c., base. Structural mills are operating well, but plate and bar mill engagement is not more than 50 per cent of capacity.

Hot-Rolled Flats.—A plan of price-making has been proposed and adopted by some, but by no means all of the makers whereby future business will be priced in accordance with the shipments over the past year to the individual buyers. To buyers who have taken shipments up to 5000 tons, the base prices of 2.10c. for material 6 in. and wider and of 2.30c. for flats less than 6 in. wide will rule, while those showing yearly takings of 5000 to 10,000 tons get a deduction of \$2 per ton, those whose shipments have run from 10,000 tons to 25,000 tons, \$3, and the few who have taken 25,000 tons, or more, will get prices determined by competition. It is said that only 1 per cent of the buyers take 5000 tons or more in a year, but that 1 per cent accounts for most of the tonnage. To many of the makers the plan only invites trouble, since multiple price schedules in the past have usually meant eventually that the market has eased off to its minimum through a forced extension of the preferential list. Adoption of the plan means that there will be minimum prices of 1.95c. for wide flats and 2.15c. for narrow, which are only slightly above the extreme low prices reached early this year during a period of demoralization. Current business is very dull.

Cold-Rolled Strips.—The demand has shown no improvement, and there have been no fresh price developments since the recent elimination of the quantity differentials covering lots of 3 to 10 tons and of 10 to 18

tons. Automobile companies are still buying very sparingly, and some, using large quantities, are buying only 10 days ahead. The proposed change of prices on hot-rolled strips, if it becomes effective, will have a considerable bearing on prices of cold-rolled strips.

Bolts, Nuts and Rivets.—Buyers are not hesitating much about signing fourth quarter contracts, but they are not specifying very freely against them or for tonnages remaining to be shipped on third quarter commitments.

Coal and Coke.—Production of beehive oven coke is still shrinking, but not so rapidly as the demand, with the result that lighter offerings have not been able to materially strengthen prices. Since there is practically no blast furnace demand for coke, it has to be sold for other uses, and just now there is not much of a market for heating coke or for fuel for smelters or for gas-making. One or two fourth quarter contracts for furnace coke are under negotiation; producers would like to get \$3.50 per net ton at ovens, since that price is necessary to let them out whole at the present scale of wages, but the need of keeping the ovens going is more urgent and business of this sort that has been closed has been well under \$3.25. The coal market is weak, particularly for slack grade, which is accumulating as a result of the preparation of household sizes. Big users of slack are too well supplied to need more at this time.

Old Material.—The market as typified by heavy melting steel is on a dead center. Consumers are no more interested now than they have been for the past few weeks, and dealers find that on account of the moderate production of scrap they cannot buy at much, if any, less than the prices that they can get from the consumers. Compressed and bundled sheets are slightly lower, and the principal user of machine shop turnings is now offering only \$11.50 for them. The market is dull and inclined toward weakness on the steel foundry grades. Short rails for iron foundry use are not salable at more than \$16.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:

Heavy melting steel	\$15.25 to \$15.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.50 to 14.75
Bundled sheets, sides and ends ..	13.50 to 13.75
Cast iron car wheels	15.00 to 15.50
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	14.00 to 14.50
No. 2 railroad wrought	15.25 to 15.50
Heavy steel axle turnings	14.00 to 14.50
Machine shop turnings	11.50 to 12.00

Acid Open-Hearth Furnace Grades:

Railroad knuckles and couplers ..	16.75 to 17.00
Railroad coil and leaf springs ..	16.75 to 17.00
Rolled steel wheels	16.75 to 17.00
Low phosphorus billet and bloom ends ..	20.00 to 20.50
Low phosphorus, mill plate	19.50 to 20.00
Low phosphorus, light grade	17.00 to 17.50
Low phosphorus sheet bar crops ..	19.00 to 19.50
Heavy steel axle turnings	14.00 to 14.50

Electric Furnace Grades:

Low phosphorus punchings	17.00 to 17.50
Heavy steel axle turnings	14.00 to 14.50

Blast Furnace Grades:

Short shoveling steel turnings ..	11.50 to 12.00
Short mixed borings and turnings ..	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.25 to 10.50

Rolling Mill Grades:

Steel car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50

Cupola Grades:

No. 1 cast	15.00 to 15.50
Rails 3 ft. and under	16.00

Malleable Grades:

Railroad	15.25 to 15.50
Industrial	14.75 to 15.00
Agricultural	14.25 to 14.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes ..	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles ..	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles ..	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets ..	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count, 62½ per cent off list	
Machine bolts, per 100 count, 62½ per cent off list	
Carriage bolts, per 100 count, 62½ per cent off list	
Nuts, all styles, per 100 count, 62½ per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft annealed, base per 100 lb. ..	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	\$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

The Alliance Tank Co. has increased its authorized capital stock from \$60,000 to \$95,000. This company was organized May 19, 1926, in Ohio, to manufacture steel tanks and miscellaneous plate work by means of the Lincoln "stable-arc" welding process. Its officers are: E. L. Coble, president and general manager; A. L. Haidet, vice-president and treasurer; George E. Harding, secretary; and Alvin Haidet and J. R. Quick, directors.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00
Rerolling, under 4-in. to and including 1½-in.	\$33.50 to 34.00
Forging, ordinary	38.00 to 40.00
Forging, guaranteed	44.00 to 45.00

Sheet Bars	
	Per Gross Ton
Open-hearth or Bessemer.....	\$34.00

Slabs	
	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.....	34.00

Skelp	
	Per Lb.
Grooved	1.75c. to 1.85c.
Sheared	1.75c. to 1.85c.
Universal	1.75c. to 1.85c.

Wire Rods	
	Per Gross Ton
*Common soft, base.....	\$43.00
Screw stock	\$5.00 per ton over base
Carbon 0.20% to 0.40% ..	3.00 per ton over base
Carbon 0.41% to 0.55% ..	5.00 per ton over base
Carbon 0.56% to 0.75% ..	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is \$43 to \$44. Cleveland mill base, \$42 to \$43.

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	
	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.50c.
Iron ore, Swedish, average 66% iron, 9.75c. to 10.00c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	39c. to 40c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.50 to \$10.75
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Per Lb.	
Molybdenum ore, 85% concentrates of MoS ₂ delivered	50c. to 55c.

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.85 to \$3.00
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.46 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis.....	9.75

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.65 to 1.85
Mine run gas coal, f.o.b. Pa. mines	1.85 to 2.00
Steam slack, f.o.b. W. Pa. mines.....	1.10 to 1.15
Gas slack, f.o.b. W. Pa. mines.....	1.25 to 1.50

Ferromanganese	
	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%	\$33.00 to \$34.00
Domestic, 16 to 19%	32.00 to 33.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$85.00 to \$87.50
75%	145.00
Per Gross Ton Furnace	
10%	\$35.00
11%	37.00
Per Gross Ton Furnace	
12%	\$39.00
14 to 16%	\$45 to 46.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$34.00
11%	36.00
	Per Gross Ton
12%	\$38.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$26.50
7%	27.50
8%	28.50
9%	30.00
	Per Gross Ton
10%	\$32.00
11%	34.00
12%	36.00

Other Ferroalloys	
Ferrotungsten, per lb. contained metal, del'd	95c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.50c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton.....	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	\$16.00 to \$16.50
No. 2 lump, Illinois and Kentucky mines.....	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay	
	Per 1000 f.o.b. Works
	First Quality Second Quality
Pennsylvania	\$43.00 to \$46.00 \$35.00 to \$38.00
Maryland	42.00 to 46.00 35.00 to 38.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00 35.00 to 38.00
Kentucky	43.00 to 46.00 35.00 to 38.00
Missouri	43.00 to 46.00 35.00 to 38.00
Illinois	43.00 to 46.00 35.00 to 38.00
Ground fire clay, per ton	7.00

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
Per 100 Pieces	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Flow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagon.....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh. †Bolts with rolled threads up to and including ½ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. 70	
Stove bolts in packages.....	80, 10 and 5
Stove bolts in bulk.....	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Large Rivets	
	Base per 100 Lb.
(½-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.75
F.o.b. Chicago	2.85 to 3.10

Small Rivets	
(¾-In. and Smaller)	
	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws	
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
	Per Cent Off List
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Good Steel Demand from Farm Equipment Makers—Charcoal Iron Weak

CHICAGO, Sept. 27.—Betterment in the Chicago district steel market is indicated more by the attitude of buyers than by any sharp upturn in demand or strength in prices. Advance sales are not large, but in contrast with previous weeks they reflect a fair degree of added confidence in the face of the fact that the expected expansion in fall business has been far below expectations. Following a slump last week sales have recovered and are now about equal to shipments, which are approximately equivalent to 60 per cent of ingot capacity. Specifications for finished steel, the best in six weeks, are coming in from widely diversified sources. Manufacturers of farm machinery are still the outstanding users and the schedules arranged by them give no hint of a recession in their production.

Mill rolling schedules are being made out only a week in advance and revisions are not uncommon at three to four-day periods. Chicago producers are taking a stand at 1.90c. on plates, shapes and bars for the full range of tonnages that are commonly placed in a market that has come to recognize that small-lot buying represents the bulk of going business.

An order for 200 underframes and fresh inquiries for 700 to 1200 freight cars are creating interest, but there may not be a favorable reflection in steel output as a result of actual orders for six to eight weeks.

Pig Iron.—Users of Northern iron have placed orders for more than 15,000 tons in the week. The largest single purchase was made by a melter at Milwaukee, the tonnage having been close to 5000. The price paid was on the basis of \$19.50, f.o.b. Chicago furnace. At the same time sales of boat iron are being made in and around Chicago at \$19 per ton. Shipments in September, although on the upturn as the month closes, will not total as large as in August. One hundred tons of low phosphorus iron brought \$30.50, delivered. It is reported here that several charcoal iron furnaces have sold, largely to non-users, 4000 to 5000 tons of iron at \$21, furnace. This cut of \$3 a ton was made in an effort to liquidate stocks on the ground. Current sales in Chicago this week have been made at \$24, furnace.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.00
Malleable, not over 2.25 sil.	19.50
High phosphorus	19.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	23.26
Southern No. 2 (barge and rail)	21.43
Low phos., sil. 1 to 2 per cent, copper free	\$30.50 to 31.00
Silvery, sil. 8 per cent.	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Sellers of spiegeleisen are looking forward to an increase in demand following the purchases of rails now contemplated by the railroads. In the meantime prices on carload lots are lacking in strength at \$33, Hazard, Pa. Specifications are lighter now than at the turn of the month.

Prices delivered Chicago: 80 per cent ferromanganese, \$97.56; 50 per cent ferrosilicon, \$85 to \$87.50; spiegeleisen, 18 to 22 per cent, \$40.76 to \$41.76.

Plates.—Two tank building programs that have been in the making for several weeks may come to a head in the next few days and swell the total of outstanding inquiry to not less than 10,000 tons. In addition, dormant inquiries for about 3000 tons are coming to life. Sales of plates are in small volume, and this is also true of specifications, the bulk of which are coming from miscellaneous users in manufacturing lines. For the first time in many weeks the railroad equipment market is commanding attention. The Pere Marquette will take figures on 500 to 1000 40-ton box cars, and the Cudahy Packing Co. is inquiring for 200

refrigerator cars. The Great Northern has closed for 200 underframes with the Siems Stembel Co., and the St. Louis Southwestern will buy 10 steel underframes. Mill prices on plates still show the effects of keen competition in past weeks. Orders in and near Chicago are for small tonnages and consequently do not provide a real test of the price of 1.90c. which local producers are trying to maintain. Prices quoted on tonnages moving into the Southwest for use in oil tank construction are still controlled by Eastern competition.

Mill prices on plates per lb.: 1.90c., base, Chicago.

Structural Material.—A fair amount of fresh inquiry, a better distribution of going tonnages among competing fabricators and revived interest in inquiries of long standing are encouraging factors in this market. The State Line Generating Co., Hammond, Ind., has awarded 7200 tons for a new power house to the McClintic-Marshall Co. and 400 tons for boiler supports to another local fabricator. The Medinah Athletic Club, calling for about 5000 tons, has been redesigned, and it is generally believed that new prices will be asked this week. The *Daily News* building, which has been reported as requiring more than 10,000 tons, appears to be approaching the bid-taking stage, as indicated by a request for prices on reinforcing bars, a step which usually follows the taking of prices on structural steel. Fresh inquiry of note includes 1000 tons for the Shedd Aquarium, 1500 tons for an addition to the Great Northern Trust Co.'s building, and 700 tons for an industrial building at Pekin, Ill. On the whole, this market gives promise of further expansion during the early fall months. Mill prices on structural material are not clearly defined, but producers are making a stand for 1.90c., Chicago, following the announcement in the East that the minimum price at Pittsburgh will be 1.75c.

Mill prices on plain material per lb.: 1.90c., base Chicago.

Reinforcing Bars.—Competition for going business is waxing keener, as bar builders sense a dropping off in fresh inquiry and realize that the true measure of shop operations throughout the fall months must be gaged by projects that are now before the trade. The tendency of output in different shops varies, but there is little doubt that the general level is a trifle below that of a week ago. School building programs are promising awards for schools totaling 750 tons in the week. Anxiety for business has weakened prices on billet reinforcing bars out of Chicago warehouses, 2.05c. to 2.45c. now being the common range. The rail steel commodity brings 1.95c. to 2.10c.

Bars.—Soft steel bars are still the most active of the heavy tonnage finished steel products. A few scattered fourth quarter contracts have been entered, but for the most part buyers cannot forecast their own business beyond the next 30 to 45 days, and are unwilling to contract further ahead. Specifications from the automobile trade are a shade lighter, but this is offset by an expansion in demand from reinforcing bar dealers and manufacturers of farm equipment. Mill prices for mild steel bars are fairly steady at 1.90c., Chicago. Iron bars are now being quoted at 1.90c., Chicago. Demand is spotty and at extremely close range. Specifications from farm equipment manufacturers are heavier, but the requirements of the railroads are lighter. Users of alloy steel bars are taking out smaller tonnages, and mill operations now range from 65 to 70 per cent of local capacity. Specifications for hard steel bars are expanding slowly, affording a closer adjustment of shipments to production and smaller additions to mill stocks, which are now of fair proportions. Orders from farm equipment manufacturers are heavier than in September a year ago, and several bed manufacturers, anticipating an upturn in business, have sized up their stocks and are again placing shipping orders. Mill prices for rail steel bars are fairly well established at 1.90c., Chicago.

Mill prices per lb.: Soft steel bars, 1.90c. base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.90c., base, Chicago.

Wire Products.—Sales are sufficiently larger in volume, so that the belief is gaining ground that the fall demand for wire products is actually getting under way. Manufacturing trade is light, with users taking

only their immediate requirements and giving little thought to shipments over the last half of the quarter. The turn for the better is limited to the jobbing trade, which has expanded in practically all parts of the country, though progress in the Northwest is slow. Shipments to manufacturers of automobiles are fully 15 per cent below those in the corresponding period in 1926. Stocks at mills are of moderate size, and production is being held at 55 to 60 per cent of capacity. Mill prices on wire and wire products are shown on page 899.

Sheets.—Sales for immediate specification are in larger volume, and mill backlogs have been expanded a trifle, with hot mill production holding at 65 per cent of capacity. Chicago delivered prices are holding at 3.15c. for black, 4c. for galvanized and 2.40c. for the blue annealed product.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Wire Rods.—Advance buying of this commodity is light, and prices range from \$43 to \$44, base Chicago mill.

Rails and Track Supplies.—Preliminary estimates indicate that 10 of the leading railroads operating west and south from Chicago will purchase approximately 450,000 tons of standard-section rails. The requirements of these same railroads a year ago totaled about 420,000 tons. Two definite inquiries for rails, totaling 15,000 tons, have appeared in the past week. Programs are being rapidly put into shape, and inquiries looked for by mills in the next two weeks will total about 350,000 tons. Prices are being asked on miscellaneous lots of track fastenings, including 35,000 kegs of spikes, 14,000 kegs of bolts and 8000 tons of steel tie plates. Orders for light rails are small, but a promise of better demand in the near future is seen in greater activity on the part of mine machinery manufacturers, who recently have received sizable orders from both union and non-union operators.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36 to \$38. *Per Lb.:* Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Specifications show some improvement as the month comes to a close, but the increase in volume is not heavy enough to bring September up to the August total. Contracting for the fourth quarter is in its last stages, and little resistance has been encountered.

Cast Iron Pipe.—The market is quiet except for an inquiry for 115 tons of 6-in. pipe by St. Marys, Ohio. The failure of the buying movement of the past week or two to continue now gives rise to the belief throughout the trade that only a moderately active market can be expected between now and the time when cold weather puts an end to the laying of pipe. In a few cases producers are making a stand for a price of \$30, Birmingham, on 6-in. and larger diameters. This is usually on small inquiries, however, and it remains to be seen whether or not quotations on large tonnages

will be made at higher price levels than have prevailed in the last few weeks.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$34.20 to \$37.20; 4-in., \$38.20 to \$41.20; Class A and gas pipe, \$4 extra.

Cold-Rolled Strip.—The announcement of new quality differentials last week has not stimulated buying to any marked degree. Users are purchasing close to actual requirements, and production has dropped a shade to 65 per cent of capacity.

Coke.—This market is steady, and shipments are satisfactory. Chicago prices for by-product foundry coke are holding. Contracts for 1928 requirements will not be presented to the trade before the early weeks in December.

Old Material.—The general price level in the scrap market is lower as a result of a lack of consumer interest and an oversupply of practically all grades. Distress tonnage has not as yet grown to alarming proportions, but it is becoming increasingly difficult for dealers to dispose of scrap as it appears on track and rejections at the mills are more numerous. The supply of borings is well matched with consumption, but users are convinced that prices a week ago were too high and offers now are not above \$11 per gross ton, delivered. Pressure to sell in the past few weeks has resulted in an oversold condition of the market, it now being apparent that many users have obligations in excess of their requirements for the duration of their contracts. Bids on railroad tonnages are noticeably lower. The size of recent lists lends support to the common belief that the carriers are hurriedly bringing scrap to the market in preference to carrying it over the winter or handling it in cold weather. Lists this week include 8000 tons offered by the Chicago, Milwaukee & St. Paul, and 5000 tons advertised by the Chicago, Burlington & Quincy.

Prices delivered consumers' yards, Chicago:

Per Gross Ton

Basic Open-Hearth Grades:

Heavy melting steel.....	\$12.25 to \$12.75
Shoveling steel	12.25 to 12.75
Frogs, switches and guards, cut apart, and miscellaneous rails.....	13.50 to 14.00
Hydraulic compressed sheets....	10.50 to 11.00
Drop forge flashings.....	9.00 to 9.50
Forged, cast and rolled steel car wheels	15.00 to 15.50
Railroad tires, charging box size.....	15.00 to 15.50
Railroad leaf springs, cut apart..	15.00 to 15.50

Acid Open-Hearth Grades:

Steel couplers and knuckles.....	13.50 to 14.00
Coil springs	15.00 to 15.50
Low phosphorus punchings.....	13.75 to 14.25

Electric Furnace Grades:

Axle turnings	12.00 to 12.50
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Blast Furnace Grades:

Axle turnings	11.00 to 11.50
Cast iron borings.....	10.50 to 11.00
Short shoveling turnings.....	10.50 to 11.00
Machine shop turnings.....	7.25 to 7.75

Rolling Mill Grades:

Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50

Cupola Grades:

Steel rails less than 3 ft.....	15.50 to 16.00
Angle bars, steel.....	13.75 to 14.25
Cast iron carwheels.....	13.75 to 14.25

Malleable Grades:

Railroad	13.50 to 14.00
Agricultural	12.75 to 13.25

Miscellaneous:

*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heavier.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:

Iron angle and splice bars.....	14.00 to 14.50
Iron arch bars and transoms....	19.00 to 19.50
Iron car axles.....	20.50 to 21.00
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.75 to 11.25
No. 1 busheling.....	9.00 to 9.50
No. 2 busheling.....	5.00 to 5.50
Locomotive tires, smooth.....	13.25 to 13.75
Pipes and flues.....	7.50 to 8.00

Cupola Grades:

No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	13.50 to 14.00
No. 1 agricultural cast.....	13.00 to 13.50
Stove plate	12.50 to 13.00
Grate bars	11.00 to 11.50
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforcing bars, billet steel.....	2.05c. to 2.45c.
Cold-finished steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.95c.
Galvanized sheets (No. 24).....	4.80c.
Blue annealed sheets (No. 10).....	3.50c.
Spikes, standard railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

Per Cent Off List

Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, squares, tapped or blank..	60
Hot-pressed nuts, hexagons, tapped or blank..	60
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg.....	\$2.85 to 2.95
Cement coated nails, base per keg.....	2.95

New York

Pig Iron Demand at Low Ebb—Steel Prices Still Under Adjustment

NEW YORK, Sept. 27.—On the eve of the fourth quarter the pig iron market is unusually quiet, with very little interest shown in requirements for that period. Some melters will carry considerable third quarter pig iron over into the next quarter on account of curtailed operations. Others bought for the final quarter of the year several weeks ago. In fact, some furnaces, notably those at Buffalo, booked enough tonnage at that time to keep them going for about 60 days and they are no longer willing to accept business at the low prices then prevalent. While current inquiries are not large enough to give the market a real test, small orders are being taken at as high as \$17, base Buffalo. One lot of 200 tons of No. 2 plain brought that price. On the other hand, the prices quoted by one or two furnaces located east of Buffalo are still very weak. Sales by local brokers during the week totaled less than 4500 tons. The Burnham Boiler Corporation has divided 400 tons of foundry between eastern Pennsylvania and Buffalo furnaces. The American Car & Foundry Co. is in the market for 100 tons each of No. 2 plain and No. 2X for its Berwick, Pa., plant. The Wilmot Engineering Co., Hazleton, Pa., is inquiring for 350 tons each of No. 2 plain and No. 2X.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail).....	\$21.41 to \$21.91
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn).....	19.00 to 19.50
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	20.14 to 22.02
East. Pa. No. 2 fdy., sil. 2.25 to 2.75.....	20.64 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25.....	21.14 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Finished Steel.—The steel market, at least so far as plates, shapes and bars are concerned, is still in a state of adjustment following the announcement of a minimum price of 1.75c., Pittsburgh, on these products by the Carnegie Steel Co. The adjustment in steel bars has proceeded further than in plates and shapes, the price situation as regards the latter having been but little affected in this district by the announcement. Buyers of steel bars, however, have lost no time in demanding 1.75c. on their orders, with the result that mills have been obliged not only to revise fourth quarter contracts entered at 1.80c., Pittsburgh, but have extended the new price to cover material now in process of rolling or about to be shipped. In view of one of two mill offers of 1.70c., Pittsburgh, for tonnage lots of bars, the price situation is still subject to close watching. The naming of 1.75c. as a minimum on plates and shapes was, as mentioned last week, an advance for some buyers of these products in this district, but it apparently has been of little effect. Some mills which have made sales of plates at 1.70c., Pittsburgh, now name 1.75c. as their minimum, but hangover business was closed at 1.70c. within the week, and the working out of the price situation on this product is not completed. Structural steel awards and inquiries, for some time the source of the largest volume of steel business in the New York territory, have fallen off sharply in the past week, a situation which is not expected to help in an upward adjustment of prices. Sheet business has been in a little larger amount than last month, but the orders are individually so small that many of the mills are inclined to disregard reports of occasional price concessions. Sales of galvanized and black sheets have been made at 3.85c. and 3c., Pittsburgh, respectively, and the mills which have made concessions of \$2 a ton have not yet seriously disturbed the market. On blue annealed sheets the situation remains unchanged in that 2.15c., Pittsburgh, is available on widths rolled by continuous mills, but 2.25c. is being paid by consumers on the wider product.

Mill prices per lb. delivered New York: Soft steel bars, 2.03c. to 2.19c.; plates, 2.09c. to 2.14c.; structural shapes, 2.09c. to 2.19c.; bar iron, 2.09c. to 2.14c.

Reinforcing Bars.—Lettings have been few, and pending work is slow in reaching the closing stage. Lacking a real test, prices are still unchanged.

Prices per lb. on billet steel reinforcing bars: From mill, 1.90c., Pittsburgh. Out of New York warehouse, 3.05c. to 3.15c., delivered at job. Out of Youngstown warehouse, 2.40c., Youngstown, or 2.77½c., delivered New York.

Ferroalloys.—Demand for both ferromanganese and spiegeleisen is confined to carload and small lots. Specifications on contract are only fairly good. A sale of a carload of British ferromanganese is noted. Prices for both alloys are unchanged.

Warehouse Business.—Purchasing from stock is slightly larger than a week ago, and some jobbers expect that September will be about as satisfactory a month as August. There is a fair movement of structural material from stock, with orders running to several tons each. There has been some small plate business recently, and a better demand for galvanized sheets

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.34c.
Soft steel bars and small shapes.....	3.24c.
Iron bars.....	3.24c.
Iron bars, Swedish charcoal.....	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons.....	4.00c.
Flats and squares.....	4.50c.
Cold-rolled strip, soft and quarter hard,	
5.75c. to 6.25c.	
Hoops.....	4.49c.
Bands.....	3.99c.
Blue annealed sheets (No. 10 gage).....	3.89c.
Long terne sheets (No. 24 gage).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galvanized annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
Machine bolts, cut thread: Per Cent Off List	
¾ x 6 in. and smaller.....	.55 to 60
1 x 30 in. and smaller.....	.50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	.55 to 60
¾ x 20 in. and smaller.....	.50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.....	.55 to 60
1 x 16 in. and smaller.....	.50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00
Discounts on Welded Pipe	
Standard Steel—	Black Galv.
½-in. butt.....	46 29
¾-in. butt.....	51 37
1-in. butt.....	53 39
2½-in. butt.....	48 35
2½-6-in. lap.....	44 17
7 and 8-in. lap.....	37 12
11 and 12-in. lap.....	
Wrought Iron—	
½-in. butt.....	5 +19
¾-in. butt.....	11 +9
1-1½-in. butt.....	14 +6
2-in. lap.....	5 +14
3-6-in. lap.....	11 +6
7-12-in. lap.....	3 +16
Tin Plate (14 x 20 in.)	
	Prime Seconds
Coke, 100 lb. base box.....	\$6.45 \$6.20
Charcoal, per box—	A AAA
IC.....	\$9.70 \$12.10
IX.....	12.00 14.25
IXX.....	13.90 16.00
Terne Plate (14 x 20 in.)	
IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25
Sheets, Box Annealed—Black, C. R. One Pass	
	Per Lb.
Nos. 18 to 20.....	3.95c. to 4.00c.
No. 22.....	4.10c. to 4.15c.
No. 24.....	4.15c. to 4.20c.
No. 26.....	4.25c. to 4.30c.
No. 28*.....	4.40c. to 4.45c.
No. 30.....	4.65c. to 4.70c.
Sheets, Galvanized	
	Per Lb.
No. 14.....	4.35c.
No. 16.....	4.45c.
No. 18.....	4.55c. to 4.60c.
No. 20.....	4.70c. to 4.75c.
No. 22.....	4.75c. to 4.80c.
No. 24.....	4.90c. to 4.95c.
No. 26.....	5.15c. to 5.20c.
No. 28*.....	5.40c. to 5.45c.
No. 30.....	5.80c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

has slightly strengthened prices, so that there is less inclination to shade the current schedule on small lots. Black sheets continue quiet, but blue annealed sheets are showing more activity.

Cast Iron Pipe.—The market is beginning to show more strength than for some time, but low prices have not entirely disappeared. There is a moderate amount of inquiry, mostly from private sources. An outstanding opening of bids in the past week was the 4250 tons of pipe for New York. On Section 1 of the contract, calling for 2150 tons of 6, 8 and 12-in. water pipe, the Donaldson Iron Co. was low at \$37 per ton, with the United States Cast Iron Pipe & Foundry Co. quoting \$39 per ton, the National Cast Iron Pipe Co., \$41.60, and R. D. Wood & Co., \$41.85. On Section 2, calling for 2100 tons of 8-in. pipe, the Warren Foundry & Pipe Co. was low at \$37.50 per ton, the United States Cast Iron Pipe & Foundry Co. bidding \$37.75. Bids were opened last week by Denville, N. J., on 30,000 ft. of 6-in., 30,000 ft. of 8-in. and 5000 ft. of 4-in. pipe, a total of about 1200 tons. Quoting on Class B water pipe, the Warren Foundry & Pipe Co. bid 88c. per ft. on the 8-in., 61c. per ft. on the 6-in. and 46c. per ft. on the 4-in., and the United States Cast Iron Pipe & Foundry Co., 89c. per ft. on the 8-in., 68c. per ft. on the 6-in. and 47½c. per ft. on the 4-in. On centrifugally cast pipe the United States Cast Iron Pipe & Foundry Co. bid 69½c. per ft. on the 8-in., 49c. per ft. on the 6-in. and 35c. per ft. on the 4-in., with R. D. Wood & Co. bidding 72c. per ft. on the 8-in., 50c. per ft. on the 6-in. and 40c. per ft. on the 4-in. All these were delivered prices. The Passaic Water Works, Passaic, N. J., is reported to have closed on a small tonnage of 30 and 36-in. water pipe. The Shevlin Engineering Co., Maspeth, Long Island, N. Y., has purchased about 1000 tons of 24-in. pipe for the Westchester County Park Commission, and the Merrit, Chapman & Scott Corporation is reported about to close on 1000 tons of large-sized pipe for the same commission.

Prices per net ton delivered New York: Water pipe 6-in. and larger, \$37.25 to \$38.25; 4-in. and 5-in., \$42.25 to \$43.25; 3-in., \$52.25 to \$53.25; Class A and gas pipe, \$4 to \$5 extra.

Old Material.—All grades are quiet, and following the slight evidences of stronger prices a week ago, the market again shows a weak tendency. No. 1 heavy melting steel continues quiet at \$13.50 per ton, delivered to Bethlehem, Pa., and Claymont, Del. Yard steel is going forward to Phoenixville, Pa., at \$11.50 per ton, delivered, and a few brokers are still shipping yard steel on old orders to a Pottsville, Pa., consumer. Chemical borings are being purchased at \$15 per ton, delivered Gibbstown, and \$14.50 per ton, delivered Bound Brook, N. J. Borings and turnings are being purchased at \$10 per ton, delivered Bethlehem, Pa., and \$10.50 per ton, delivered Sparrows Point, Md. Consumers at Conshohocken, Swedeland and Harrisburg, Pa., are reported temporarily out of the market.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel.....	\$10.00 to \$10.85
Heavy melting steel (yard).....	7.00 to 8.00
No. 1 heavy breakable cast.....	11.50 to 12.50
Stove plate (steel works).....	9.00 to 9.25
Locomotive grate bars.....	8.75 to 9.25
Machine shop turnings.....	7.00 to 7.50
Short shovelling turnings.....	7.00 to 7.50
Cast borings (blast furnace or steel works).....	7.25 to 7.50
Mixed borings and turnings.....	6.50 to 7.50
Steel car axles.....	16.25 to 17.25
Iron car axles (noni.).....	23.50 to 24.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	9.25 to 9.50
Forge fire.....	6.50 to 7.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought, long.....	10.50 to 11.00
Rails for rolling.....	10.25 to 10.75
Cast iron carwheels.....	11.50 to 12.00
Stove plate (foundry).....	9.00 to 9.50
Malleable cast (railroad).....	10.25 to 10.75
Cast borings (chemical).....	11.00 to 12.50

Prices per gross ton, delivered local foundries:
No. 1 machinery cast.....\$14.00 to \$14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size 12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.).....11.50 to 12.00

Coke.—Demand is still limited to small tonnages for prompt shipment, and prices are unchanged at \$4 to \$4.25 per net ton, Connellsville, for standard foundry and \$3 to \$3.25 for furnace grade. Consumers show but little interest in contracting, and producers are not seeking very long commitments at the present schedule

of prices. Delivered prices on Connellsville foundry coke are: To northern New Jersey, \$8.03 to \$8.28; to New York or Brooklyn, \$8.79 to \$9.04; to Newark or Jersey City, N. J., \$7.91 to \$8.16. By-product coke continues to range from \$9.46 per net ton for West Virginia coke to \$9.59 and \$10.77 per net ton for local production, delivered Newark or Jersey City.

Cleveland

Blue Annealed and Black Sheets Weaker —Differentials Adopted for Hot Strip

CLEVELAND, Sept. 27.—The demand for finished steel shows little, if any, improvement and bookings this month in this territory by several of the mills will hardly equal the tonnage sold in August. The uncertainty of the price situation that existed a week ago has been largely clarified by the rather general adoption of 1.75c., Pittsburgh, for steel bars, plates and structural material. This price commonly applies to steel bars for less-than-carload lots except for very small lots or assorted sizes. A Cleveland mill is quoting plates at 1.75c., Pittsburgh, for lots of any size, and some of the outside mills are not attempting to get a higher price for small lots. Cleveland mills are quoting steel bars at 1.75c., mill. This has resulted in a more highly competitive situation in the bar market in this territory than on plates and shapes.

The light demand for finished steel is to a large extent due to the limited buying by the automotive industry. This is affecting the forge and stamping shops in this territory, which have little business. Buying by Michigan automobile companies, which was expected to develop from several fourth quarter inquiries sent out recently, has been disappointing. Orders actually placed were for small lots for early needs or for indefinite requirements.

Considerable uncertainty exists as to the price situation on sheets and hot-rolled strip steel, and a good test of prices on blue annealed sheets and hot-rolled strip is expected in the next few days on inquiries that have come from local stamping companies for round tonnages for parts for the Chevrolet car. Alloy steel bars have become slightly more active, and recent sales have developed price irregularities.

In the structural field, inquiry shows a slight gain, particularly for small lots. An inquiry has come out for 600 tons of sheet steel piling for the foundations of the Buffalo city hall, which will require approximately 6000 tons of structural material, which will be placed later.

Pig Iron.—A moderate volume of business continues to come from scattered sources, and Cleveland interests during the week sold 14,000 tons of foundry and malleable iron, or approximately the same amount as during the previous week. Among the larger orders was 1000 tons placed by a Kokomo, Ind., melter with a Lake furnace and 1000 tons purchased by the International Harvester Co. for its Springfield, Ohio, plant. The latter is understood to have gone to a Columbus furnace having a freight advantage. Very little business is being placed in Cleveland and vicinity, and sales in Michigan, for the most part, have dwindled down to car lots. The Lake furnace price is holding rather steadily at \$17.50, at which some round-lot business was taken

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforcing steel bars.....	2.25c. to 3.00c.
Cold-finished rounds and hexagons.....	3.65c.
Cold-finished flats and squares.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.65c.
Blue annealed sheets (No. 10).....	3.25c.
No. 9 annealed wire, per 100 lb.....	\$2.90
No. 9 galvanized wire, per 100 lb.....	3.35
Common wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

during the week. However, there has not been a test recently of the market on business for highly competitive points, and \$17.50, furnace, would probably be shaded 25c., or more, per ton for shipment into outlying districts where sellers have a freight disadvantage. The Cleveland price is unchanged at \$18.50, furnace. In Michigan there is a price range of \$17.50 to \$18, furnace. The automotive industry, which cut down its shipping orders materially several weeks ago, shows no indication of releasing larger quantities of iron, and a great deal due on third quarter contracts both to automobile companies and jobbing foundries doing automobile work will be carried over into the fourth quarter.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$19.00
Southern fdy., sil. 1.75 to 2.25.....	23.25
Malleable	19.00
Ohio silvery, 8 per cent.....	31.50
Basic, Valley furnace	17.00
Standard low phos., Valley furnace.....	27.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Semi-Finished Steel.—A quotation of \$33, Youngstown, for the fourth quarter is reported on sheet bars for shipment to a competitive point, or a concession of \$1 a ton from the commonly quoted price. Orders are limited to early needs.

Sheets.—Mills are getting very little new business, and orders are only for small lots. With the increasing need of the mills for tonnage, the market has a weaker tone. Black sheets have held well in this territory until the past day or two, when quotations of 2.90c., Pittsburgh, or a \$2 a ton concession appeared, making the price situation on this grade at present rather unsettled. Light plates, as well as hot-rolled strip, are competing with blue annealed sheets, and the reduction in plates has a bearing on the price situation affecting this grade of sheets, on which there is a spread of from 2.15c. to 2.25c., Pittsburgh. However, as low as 2c. is reported to have been quoted in Detroit. Galvanized and automobile body sheets appear to be holding to regular quotations.

Strip Steel.—Quantity differentials on hot-rolled strip steel have been adopted by some of the mills. Under these, consumers using less than 5000 tons a year will pay the base price, consumers of 5000 to 10,000 tons will get a \$2 a ton concession, and users of 10,000 to 25,000 tons will be allowed a \$3 a ton discount. As most consumers use less than 5000 tons a year the quantity differential will benefit few buyers, mostly in the automotive field. While no concessions from regular quotations are reported, the market is in an unsettled condition. Present prices have not been tested, as consumers have been using low-priced material and sales at the prevailing quotations have been in small lots. There is not much activity in cold-rolled strip, but the market appears to be holding to 3c., Cleveland, for lots of 3 tons and over.

Reinforcing Bars.—Aside from a local award of 600 tons, the market shows little activity. Rail steel bars are unchanged at 1.65c., mill, but little effort is being made to compete with billet steel bars in this immediate territory.

Warehouse Business.—The seasonal demand has resulted in a slight improvement in orders. Local jobbers are maintaining prices on all products. However, some shading on steel bars is being done by jobbers in outlying districts.

Iron Ore.—Shipments of Lake Superior ore are going forward at a rate of slightly more than 7,000,000 tons for the month, but there will be a sharp falling off in October, as some of the shippers have nearly cleaned up their shipping orders and are now having trouble in finding ore cargoes for their boats. Late season sales have been rather light.

Coke.—The market is weaker on Connellsville foundry coke, as some makes that have been selling at \$4.25, ovens, have been reduced 25c. a ton. The range is unchanged at \$4 to \$5.35, ovens. On foundry heating coke there is a spread from \$2.75 to \$3.15, ovens. By-product coke is finding a somewhat better market

for domestic use, and one Ohio producer has advanced its price 25c. a ton to \$5, ovens, for egg size.

Fluorspar.—The market shows a little more activity than recently, but sales for the most part have been in small lots for current needs. Only one steel plant in this territory has as yet covered for its winter requirements. Prices since the recent decline on gravel fluorspar appear well established at \$16.50 per net ton, mines, for car lots and \$16 for larger lots.

Bolts, Nuts and Rivets.—While bolt and nut manufacturers are feeling the effects of the curtailment of the automotive industry, orders from implement manufacturers have improved and a little business is now coming from the railroads which had been virtually out of the market for some time. Consequently, with some manufacturers September will show a slight gain in orders over August. Rivet consumers are freely signing fourth quarter contracts, but their specifications continue light. Prices are being well maintained.

Old Material.—While the market has a weak tone, prices are holding remarkably well in view of the fact that the demand is very limited. Consumers are showing no interest in purchases, and one large consumer in northern Ohio has ordered shipments of blast furnace scrap suspended. Dealers are paying 14 for small lots of No. 1 heavy melting steel and \$10.75 to \$11 for blast furnace scrap, being able to buy car lots at the lower price. Michigan automobile manufacturers have sent out their October scrap lists, which are lighter than recently, owing to the curtailment in motor car production. The larger lists are from the Chevrolet and Chrysler companies, 3150 tons each, and from Dodge Brothers, Inc., 2500 tons.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$13.75 to \$14.00
No. 2 heavy melting steel.....	13.25 to 13.50
Compressed sheet steel.....	13.25 to 13.50
Light bundled sheet stampings...	11.50 to 12.00
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.75 to 14.00
No. 1 busheling	11.50 to 11.75
Pipes and flues	10.00 to 10.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops...	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops.	16.00 to 16.50
Low phosphorus plate scrap.....	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.50 to 16.00
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.....	2.65c. to 3.00c.
Plates, ⅝-in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands)....	2.50c. to 3.00c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished....	4.30c.
Reinforcing steel bars, square, twisted and deformed.....	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅝-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24).....	4.35c.
Galvanized sheets (No. 24)....	5.20c.
Blue annealed sheets (No. 10)...	3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅝-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Philadelphia

Prices of Plates, Shapes and Bars Undergoing Slow Adjustment

PHILADELPHIA, Sept. 27.—Prices of plates, shapes and bars are going through a period of adjustment subsequent to the recent announcement by the Carnegie Steel Co. of a minimum of 1.75c., Pittsburgh, with 1.85c. on small lots, on these three products. Bar contracts and orders have been written down to the basis of 1.75c. Many of those recently entered had been put on the books at 1.80c. The plate market has apparently been lifted to a minimum of 1.75c. Sales have been made during the past week at 1.70c., but all new quotations are said to adhere firmly to a minimum of 1.75c. In the case of structural shapes an advance from the extreme lower levels will not be so easy to work out in view of the widely different prices that mills have quoted on tonnages of varying degrees of attractiveness. On the ordinary lots of a carload or more mills are now quite uniformly quoting 1.75c., Pittsburgh, but there is a good deal of tonnage on which fabricators have been protected at lower figures.

With fourth quarter close at hand, pig iron sales have shown no gain and prices are weak. The scrap market is dull and prices are stationary.

Pig Iron.—Eastern Pennsylvania producers of pig iron will enter fourth quarter production with no material increase in the tonnage on their books. The increased volume of buying which sometimes precedes the opening of a new quarter has not developed, and the assumption is that nearly all melters have enough iron on order to carry them well through the next three months. In the competition for business furnaces are making concessions, especially when quoting against furnaces having lower freight rates to the point of delivery. For Philadelphia delivery the common prices are \$19.50, base, for the more attractive tonnages and \$20, base, for small lots. In some instances furnaces net less than \$19, f.o.b. shipping point. The largest inquiry before the trade is for 3000 tons of low phosphorus iron for the Standard Steel Works, Burnham, Pa.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.26 to \$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.26
East. Pa. No. 1X, 2.25 to 2.75 sil.	21.26 to 21.76
Basic (delivered eastern Pa.)	20.60
Gray forge	20.50 to 21.00
Malleable	21.50 to 22.00
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.29 to 25.54
Virginia, No. 2X, 2.25 to 2.75 sil.	25.79 to 26.04

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Plates.—Quotations lower than 1.75c., Pittsburgh, have been withdrawn except where commitments already have been made, and at the moment plates seem to be fairly well stabilized at that figure. On small lots some mills are asking 1.80c., Pittsburgh. In the case of certain business that had been entered at 1.80c. the new price means a downward adjustment. There is no gain in tonnage, and operations are unsatisfactory from the mill point of view. Flood conditions at Coatesville last week temporarily interfered with production at the plants of the Lukens Steel Co. and the Bethlehem Steel Co., but repairs have been made.

Structural Shapes.—The recent announcement by Carnegie Steel Co. of a minimum of 1.75c., Pittsburgh, on shapes has encouraged independent mills to follow its lead, and quotations on new business are now being made on that basis. On an inquiry for 1000 tons the quotation of a large producer was 1.75c., but the business has not been closed. Fabricators have been given protection at lower than 1.75c. on a good deal of outstanding tonnage, which makes it apparent that it may take some time to work out a price level that will be more satisfactory to the mills. Meanwhile, new business is in small volume.

Bars.—Makers of steel bars represented in this district have quite generally given to their customers quotations of 1.75c., Pittsburgh, on business of sufficient

attractiveness to warrant the minimum price. In most cases fourth quarter contracts and unshipped orders have been revised to the new basis. The amount of incoming business is small. Eastern bar iron makers quote 2.09c., delivered Philadelphia.

Sheets.—With respect to prices, conditions show no marked change within the week. There is a degree of weakness, but it is not pronounced because buyers have so little tonnage to offer. Blue annealed sheets are being sold at 2.15c., Pittsburgh, when brought into competition with the sizes rolled by continuous mills, but on other sizes 2.25c. is usually being obtained. Concessions of \$1 and \$2 a ton on black and galvanized sheets are reported, but there is nothing to indicate that price cutting has become widespread.

Warehouse Business.—Competition among jobbers for orders for steel bars has brought prices down to a minimum of 2.50c., Philadelphia, both for merchant and reinforcing steel.

Imports.—Steel receipts from abroad last week totaled 750 tons as follows: 378 tons of steel bars from France; 172 tons of structural shapes from Belgium, 155 tons from France and 45 tons from Germany. The only pig iron importation was 1416 tons from India.

Old Material.—There is very little demand for scrap from consumers and the market is weaker in tone, but prices are unchanged. Heavy melting steel is available at \$14, delivered, but there are no buyers. A leading buyer of machine shop turnings, bundled sheets, stove plate and grate bars is offering \$11 for the two former grades and \$13 for the two latter.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$14.00
Scrap T rails	\$13.00 to 13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.50 to 12.00
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)	13.00 to 13.50
No. 1 low phos., heavy, 0.04 per cent and under	18.50 to 19.50
Couplers and knuckles	16.75
Roller steel wheels	16.00 to 16.50
No. 1 blast furnace scrap	10.50
Machine shop turnings (for rolling mill)	11.50 to 12.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	10.50 to 11.00
Steel rails for rolling	16.00 to 16.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Cast borings (for chemical plant)	15.00 to 16.00

Hoisting Company Merger Approved

Stockholders of both companies approved, on Sept. 26, the merger of the Brown Hoisting Machinery Co., Cleveland, and the Industrial Works, Bay City, Mich. The new company, to be known as the Industrial-Brown Hoist Co., will have its general offices in Cleveland. Its president will be Alexander Brown, who has been at the head of the Cleveland company.

Farrel-Birmingham Co. Formed by Merger of New England Companies

Two old and well known New England companies, the Farrel Foundry & Machine Co., Ansonia, Conn., and the Birmingham Iron Foundry, Derby, Conn., have been merged as the Farrel-Birmingham Co. by unanimous vote of the stockholders of both companies. The new company starts with a capital stock of \$5,700,000. Officers are: President, Charles F. Bliss; vice-presidents, F. D. Wanning, Walter Perry, Franklin Farrel, Jr.; secretary, George C. Bryant; assistant secretaries, Carl Hitchcock and W. B. Marvin; treasurer, Alton Farrel; assistant treasurers, F. M. Drew, Jr., and Donald G. Warner.

The Farrel Foundry & Machine Co. has been in existence since 1848 and the Birmingham Iron Foundry was established in 1836. Both are manufacturers of heavy machinery for various industries.

Cincinnati

Pig Iron Weak — Steel Buying Slows Up — Heavy Melting Declines

CINCINNATI, Sept. 27.—No improvement is noted in the pig iron market, which is devoid of important sales and inquiries. In many cases melters have been taking iron at a reduced rate, and therefore much contract tonnage for third quarter delivery will not be shipped until well into the fourth quarter. Foundrymen see little prospect for an increase in their production during the next few weeks, so that they are hesitant about incurring further obligations at the moment. The lack of interest on the part of consumers has had the effect of bringing out low prices in some instances. In the past week a central Ohio company is reported to have bought iron from a Lake Erie producer at less than \$17, base Cleveland. With northern Ohio sellers seeking business in this territory, Ironton makers find it increasingly difficult to dispose of their iron at \$19, base furnace. In silvery iron the market is firm at \$28.50, base Jackson, for 8 per cent. Both Tennessee and Alabama iron are being quoted on the basis of \$17.25, Birmingham, but sales have consisted of small lots.

Prices per gross ton, delivered Cincinnati:	
So. Ohio fdy., sil. 1.75 to 2.25....	\$20.89
So. Ohio malleable.....	\$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25....	20.94
Alabama fdy., sil. 2.25 to 2.75....	21.44
Tennessee fdy., sil. 1.75 to 2.25....	20.94
Southern Ohio silvery, 8 per cent	30.39

Freight rates: \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Specifications and orders for heavy steel products, such as bars, shapes and plates, have been curbed temporarily by the establishment of a price of 1.75c., base Pittsburgh, on sizable tonnages and of 1.85c. on small lots. Buyers in this territory have been paying 1.80c. for a considerable time, and pressure now is being brought to bear by numerous consumers to secure a concession of from \$1 to \$2 a ton on single carload business. Mills have refused to make sales on that basis, and consequently purchases have been delayed. Buyers are of the opinion that producers are in none too strong a position and therefore deem it advisable to postpone definite action. That a compromise may be reached by restoring the former price of 1.80c. is the report which is current in this market and which is given credence. In structural steel, awards have been limited principally to small tonnages, although the McClintic-Marshall Co. will supply 1500 tons for two jobs in Louisville. Small fabricators in this territory are fairly busy, but some of the larger local shops are in need of work. Sheet prices are stiffening slightly, fewer irregularities having been noted. In the South galvanized sheets for roofing purposes are still being sold at from \$2 to \$4 a ton under the common quotation of 3.85c., base Pittsburgh, which is holding well in this district. Both blue annealed and black sheets have been firm at 2.25c. and 3c., base Pittsburgh, respectively.

Reinforcing Bars.—New billet bars are quoted at 1.75c. to 1.85c., base Pittsburgh, but sellers are having

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes....	3.40c.
Bars, soft steel or iron.....	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel.....	4.75c. to 5.00c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue annealed sheets (No. 10)...	3.60c.
Structural rivets	3.85c.
Small rivets .....	.65 per cent off list
No. 9 annealed wire, per 100 lb.....	\$3.00
Common wire nails, base per keg.....	2.95
Cement coated nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.	39.00

difficulty in obtaining the latter figure. Rail steel bars are bringing 1.65c. to 1.75c., base mill.

Warehouse Business.—The market is somewhat spotty. Jobbers report that the volume of business varies sharply from day to day, and total sales in the past week have been only fair at best. Demand for structural steel and tank plates has been well sustained, but other products have been moving slowly. Prices are unchanged.

Coke.—The market continues dull, although sales of by-product domestic coke have turned upward. In fact, the walnut size probably will advance 50c. a ton to \$4.50 per net ton, f.o.b. ovens, on Oct. 1. By-product egg, however, is expected to remain at \$5.50, ovens. Specifications for by-product foundry coke have been disappointing, September shipments having been less than those of August.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, \$5.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—Heavy melting steel has again declined, the reduction amounting to 25c. a ton. A number of small dealers who have accumulated material for the past year or longer have recently been forced to sell because of their inability to finance their operations over a longer period. The result has been that many dealers suffered substantial losses and considerable scrap was thrown on the market. When this material is absorbed, prices are expected to stiffen slightly. Meanwhile steel plants are taking only small tonnages on contract, while foundries are buying only what they need for current requirements.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.75 to \$12.25
Scrap rails for melting.....	13.00 to 13.50
Loose sheet clippings	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.00 to 14.50
No. 1 railroad wrought	11.00 to 11.50
Short rails	17.50 to 18.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	17.50 to 18.50
No. 1 railroad cast	14.00 to 14.50
Burnt cast	8.00 to 8.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50

Birmingham

Steel Demand Improves — No Fourth Quarter Buying of Pig Iron

BIRMINGHAM, Sept. 27.—With the beginning of fourth quarter close at hand only a limited tonnage of pig iron has been sold for that period. Orders continue to be placed for prompt delivery and range in size from one carload to 500 tons. Stocks on consumers' yards are being kept as small as possible, and purchases of iron are being increased only when new business received by melters warrants it. In general, foundry melt is at about the same rate as a month ago. Surplus stocks of iron on furnace banks are showing some increase, and with steel companies selling foundry iron on the open market, it is unlikely that merchant furnace operations will be expanded during the remainder of this year. Prices are unchanged.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.....	\$17.25
No. 1 foundry, 2.25 to 2.75 sil.....	17.75
Basic	17.25
Charcoal, warm blast	29.00

Finished Steel.—The market has been enlivened by railroad orders and several contracts for fabricated steel. The 61,600 tons of rails recently ordered by the Louisville & Nashville Railroad will be rolled by the Tennessee company from October until March. The Ingalls Iron Works has booked contracts for fabricated steel totaling 1400 tons. Fabricating work in prospect includes further State improvements at the port of Mo-

bile, additions to the Warrior River barge fleet and construction in the West.

Cast Iron Pipe.—Lettings of pressure pipe were a little heavier in the past week, but further weakness in prices has been reported. Sales have been made at less than \$29 per net ton, Birmingham, for 6-in. and larger diameters. Stocks of pipe in foundry yards are being reduced.

Coke.—Foundry coke is in steady demand, and independent ovens are shipping their entire production. Prices are firm at \$5.50 per net ton, Birmingham, on contracts and at \$6 on spot orders. Despite the reaction in other industries, coke plants in Alabama have enjoyed an excellent business so far this year.

Old Material.—Prices are slightly stronger on heavy melting steel, No. 1 cast and stove plate, for which there is a better demand. Other grades are quiet, with prices weak.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel.....	\$10.50 to \$11.00
Scrap steel rails.....	12.50 to 13.00
Short shoveling turnings.....	8.50 to 9.00
Cast iron borings.....	8.50 to 9.00
Stove plate.....	13.00 to 14.00
Steel axles.....	16.00 to 17.00
Iron axles.....	16.00 to 17.00
No. 1 railroad wrought.....	11.00 to 12.00
Rails for rolling.....	13.00 to 14.00
No. 1 cast.....	14.00 to 15.00
Tramcar wheels.....	12.50 to 13.50
Cast iron carwheels.....	12.00 to 13.00
Cast iron borings, chemical.....	13.00 to 13.50

Buffalo

City Hall to Take 10,000 Tons of Steel—Pig Iron Buying Restricted

BUFFALO, Sept. 27.—The pig iron market is quiet, with quotations unchanged at \$17, Buffalo, for No. 2 plain and malleable. An inquiry from Hazleton, Pa., for 350 tons of No. 2 plain and 350 tons of No. 2X is believed to have been closed. Another recent inquiry from Titusville, Pa., called for 1000 tons, part of which has been placed. A considerable number of miscellaneous lots have been sold at \$17, Buffalo, for No. 2 plain, and furnace companies believe that this price is due to hold.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25..	\$16.50 to \$17.00
No. 2X foundry, sil. 2.25 to 2.75..	17.00 to 17.50
No. 1X foundry, sil. 2.75 to 3.25..	18.00 to 18.50
Malleable, sil. up to 2.25.....	16.50 to 17.50
Basic.....	16.50 to 17.00
Lake Superior charcoal.....	27.28

Finished Iron and Steel.—Bars and shapes are firm at 2.015c. per lb., Buffalo, with demand fair. Shape mills are endeavoring to get 2.065c., Buffalo, on regular business and 2.115c. on miscellaneous lots. One of the most important fabricated jobs in this territory is the new local city hall, bids for which are due early in November. This structure will require 10,000 tons. There will be about 1000 tons of sheet piling in the foundations. Inquiry for sheets is better, and orders are more numerous. Mill prices are still firm. Demand for automobile body sheets is not so good as it was expected to be at this time. Sheet mills are operating at about 65 per cent, and general mill operations range from 65 to 70 per cent. Business in wire products is fair, and there is a healthy demand for bolts and nuts.

Old Material.—There has been no important buying during the past week, and the market is extremely quiet. One of the mills which recently permitted a resumption of shipments after a long period has not entirely barred them again, but is taking them only in a restricted way. Hence the movement of heavy

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-finished flats, squares and hexagons.....	4.45c.
Rounds.....	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.30c.
Galvanized sheets (No. 24).....	5.15c.
Blue annealed sheets (No. 10).....	3.80c.
Common wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

melting steel has been again retarded. The only transactions recorded, those among dealers, do not cover any large lots. Several railroad lists are due this week. The prices that they bring out are expected to be lower than those realized on the last lists.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$14.75 to \$15.00
No. 2 heavy melting steel.....	14.00 to 14.25
Scrap rails.....	14.50 to 15.00
Hydraulic compressed sheets.....	12.25 to 12.50
Hand-bundled sheets.....	9.00 to 9.50
Drop forge flashings.....	11.50 to 12.00
No. 1 busheling.....	13.00 to 13.25
Heavy steel axle turnings.....	12.75 to 13.25
Machine shop turnings.....	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers.....	15.75 to 16.25
Railroad coil and leaf springs.....	17.00 to 17.50
Rolled steel wheels.....	15.75 to 16.25
Low phosphorus billet and bloom ends.....	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings.....	12.75 to 13.25
Short shoveling steel turnings.....	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings.....	10.75 to 11.00
Short mixed borings and turnings.....	9.75 to 10.00
Cast iron borings.....	10.00 to 10.50
No. 2 busheling.....	9.00 to 9.50
Rolling Mill Grades	
Steel car axles.....	15.00 to 16.00
No. 1 railroad wrought.....	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast.....	15.25 to 15.75
Stove plate.....	13.50 to 14.00
Locomotive grate bars.....	11.00 to 11.50
Steel rails, 3 ft. and under.....	16.50 to 17.00
Cast iron carwheels.....	14.00 to 14.50
Malleable Grades	
Railroad.....	15.00 to 15.50
Agricultural.....	15.00 to 15.50
Industrial.....	15.00 to 15.50

Toronto

Pig Iron Strong Locally but Lower at Montreal—Scrap Exports Gain

TORONTO, ONT., Sept. 27.—Last quarter pig iron buying has shown general improvement in the Canadian markets, despite the fact that producing interests are not pressing for contract business. Inquiries have increased considerably during the past few days, and advance buying has become general throughout eastern Canada. The stiffening of prices in the Buffalo market has been noted with interest by local consumers. As a consequence of this, together with prospects of higher prices here, many melters are now coming forward with contracts, and some large orders have recently been taken by producers. Some selling agents are declining future contracts at present prices and positively refuse to quote on new business. It is contended that the existing price for foundry and malleable iron is actually below the cost of production. The demand on spot account is maintained at a fairly high level, with a steady flow of orders for 100 to 200 tons and others calling for as much as 500 tons. It has been stated in some quarters that a few sellers have restored the silicon differential between No. 1 and No. 2 foundry iron, asking 50c. per ton more for No. 1 iron. In the Montreal market, where there is rather keen competition, both from United States and European producers, pig iron can be purchased as low as \$25.25 to \$25.50 per ton, and some orders have recently been taken as this rate. Toronto prices, however, remain firm.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75.....	\$23.60
No. 2 foundry, sil. 1.75 to 2.25.....	23.60
Malleable.....	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75.....	25.50
No. 2 foundry, sil. 1.75 to 2.25.....	25.50
Malleable.....	25.50
Basic.....	24.50
Imported Iron at Montreal Warehouse	
Summerlee.....	33.50
Carron.....	33.00

Old Material.—Sales show some improvement, but the gain in demand has not been impressive. Inquiry for last quarter delivery has increased and some contracts have been placed, but, generally speaking, advance buying is not brisk in either the Toronto or the Montreal district. Dealers report spot orders more nu-

merous, and the majority of these call for larger tonnages than was the case a month or six weeks ago. Orders against contracts are also responsible for a fairly good movement of old material between dealers and consumers. Exports of scrap during the first three months of the fiscal year ended with June 30 reached a total of 21,297 tons, which compares with 9917 tons for the corresponding three months of 1926. The United States took 20,567 tons for the three months this year, as against 9399 tons during the same three months a year ago. The remaining tonnage was shipped to the United Kingdom and Japan. Canadian dealers look for further expansion in export business, but at the moment there is little prospect for any change for the better. Dealers' buying prices both in Toronto and Montreal are unchanged, although showing more strength.

Dealers' buying prices:

	Toronto	Montreal
<i>Per Gross Ton</i>		
Heavy melting steel.....	\$9.50	\$9.00
Rails, scrap.....	10.00	10.00
No. 1 wrought.....	10.00	11.00
Machine shop turnings.....	7.00	6.00
Boiler plate.....	7.00	7.00
Heavy axle turnings.....	7.50	8.00
Cast borings.....	7.50	6.00
Steel turnings.....	7.00	7.00
Wrought pipe.....	5.00	6.00
Steel axles.....	14.00	19.00
Axles, wrought iron.....	16.00	21.00
No. 1 machinery cast.....	.....	17.00
Stove plate.....	.....	12.50
Standard carwheels.....	.....	16.00
Malleable scrap.....	.....	14.00
<i>Per Net Ton</i>		
No. 1 machinery cast.....	15.00	.....
Stove plate.....	9.00	.....
Standard carwheels.....	13.00	.....
Malleable scrap.....	13.00	.....

Boston

Prices Shaded on a 500-Ton Purchase of Pig Iron — Scrap Easier

BOSTON, Sept. 27.—On the first competitive business in this market within three weeks, 500 tons of No. 2X for October, November and December delivery to a Massachusetts foundry, furnaces shaded prices in some instances 50c. to 75c. a ton. A furnace east of Buffalo took the business at \$21.27 a ton, delivered, which is equivalent to \$16.36 a ton at Buffalo furnace. Although they shaded prices on this business, furnaces east of Buffalo did not drop to the Sept. 1 price level. Otherwise, business booked in New England in the past week was in much smaller lots, aggregating about 4000 tons. The Mystic Iron Works took a small tonnage for delivery outside New England. Because of the opening of negotiations with Pilling & Co., Boston, importers of Dutch iron, who may desire to lease the municipal dock at Field's Point, Providence, R. I., for unloading pig iron, the terminal development committee of that city has voted to notify William H. Muller & Co., Inc., that a similar lease, held since 1924, will be terminated about the first of the new year. The Muller lease provides that if the concern does no business at the dock within

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars and small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway, rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tire steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons.....	4.05c.
Squares and flats.....	4.55c.
Toe calk steel.....	6.00c.

a calendar year, the lease may be forfeited upon three months' notice.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25.....	\$21.41 to \$21.91
Buffalo, sil. 2.25 to 2.75.....	21.91 to 22.41
East. Penn., sil. 1.75 to 2.25.....	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75.....	23.65 to 24.15
Virginia, sil. 1.75 to 2.25.....	25.96 to 26.21
Virginia, sil. 2.25 to 2.75.....	26.46 to 26.71
Alabama, sil. 1.75 to 2.25.....	24.16 to 26.02
Alabama, sil. 2.25 to 2.75.....	24.66 to 26.52

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Warehouse Business.—Warehouses report that buying is still on a hand-to-mouth basis, with weekly total shipments just about on a par with those of a month ago. Stocks are fairly well assorted but not heavy, and warehouses are only buying tonnages required for immediate wants. Prices are still elastic, because of keen competition for business and offerings of imported material.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. intimate that their prices on by-product coke as of Oct. 1 will remain at \$12 a ton, delivered, within a \$3.10 freight rate zone. They add, however, that if any change is made it will be upward. Specifications against fuel contracts are not much heavier than during the first week of September, an indication that foundry melt in New England has not increased much. Connellsville district foundry coke is offered at delivered prices under those quoted by New England ovens, but sales are few and far between.

Old Material.—The market for shafting, street car axles and rails for rerolling is 50c. a ton, or more, lower. The undertone of the market for other materials appears easier on the surface; yet prices are not actually lower. Business is confined very largely to heavy melting steel, steel turnings, steel mill borings, bundled skeleton and forge scrap, but shipments out of New England are not increasing as much as dealers anticipated earlier in the month. On old orders \$10.60 a ton was paid in the past week for chemical borings, \$6.60 for forge scrap, \$7.10 for steel mill borings and \$6.60 for steel turnings, these prices all being 10c. above average quotations and representing a cut in the brokers' commission. No. 1 machinery cast continues to bring a premium over textile cast, but the demand for both grades is slow.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$9.00 to \$9.50
Scrap rails.....	8.50 to 8.75
No. 1 railroad wrought.....	10.50 to 11.00
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings.....	6.00 to 6.50
Cast iron borings (steel works and rolling mill).....	6.50 to 7.00
Bundled skeleton, long.....	6.00 to 6.50
Forge flashings.....	6.50 to 7.00
Blast furnace borings and turnings.....	5.75 to 6.00
Forged scrap.....	6.00 to 6.50
Shafting.....	13.00 to 13.50
Street car axles.....	17.00 to 17.50
Wrought pipe (1 in. in diameter, over 2 ft. long).....	8.00 to 8.50
Rails for rerolling.....	10.25 to 10.75
Cast iron borings, chemical.....	10.00 to 10.50

Prices per gross ton delivered consumers' yards:

Textile cast.....	\$15.00 to \$15.50
No. 1 machinery cast.....	15.50 to 16.00
No. 2 machinery cast.....	12.50 to 13.00
Stove plate.....	12.00 to 12.50
Railroad malleable.....	14.00 to 14.50

Scrap Market Weak at Detroit

DETROIT, Sept. 27.—The old material market in this district is showing some weakness without any reduction in prices. There has been no buying within the past two weeks, and current orders are sufficient to take care of releases from the producers. Prices are unchanged.

Dealers buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel.....	\$12.50 to \$13.00
Borings and short turnings.....	9.00 to 9.50
Long turnings.....	7.50 to 8.00
No. 1 machinery cast.....	17.00 to 18.00
Automobile cast.....	18.50 to 19.50
Hydraulic compressed sheets.....	11.00 to 11.50
Stove plate.....	11.50 to 12.50
No. 1 bushing.....	10.00 to 10.50
Sheet clippings.....	7.50 to 8.00
Flashings.....	10.25 to 10.75

St. Louis

Better Demand for Coke — Heavy Output of Sheets and Tin Plate

ST. LOUIS, Sept. 27.—The pig iron market continues dull. Sales of the local maker totaled only 2200 tons for the week, 800 tons of which was sold to a Missouri melter, while the remainder was distributed in small lots among local interests. Foundry melt is heavier in this district, and shipments show great improvement. Hand-to-mouth buying still prevails, however. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b.	
Granite City, Ill.	\$19.50 to \$20.00
Northern No. 2 fdy., delivered	
St. Louis	21.66
Southern No. 2 fdy., delivered	21.67
Northern malleable, delivered	21.66
Northern basic, delivered	21.66

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Old Material.—The only activity in the market during the week was the purchase by a few consumers of a small tonnage of cast scrap. The remainder of the list is dead. Prices on heavy melting steel, heavy shoveling steel, No. 2 railroad wrought and railroad malleable are off 50c. a ton, and miscellaneous rails, etc., are off 25c. a ton, with other items unchanged. Railroad lists include: Chicago, Burlington & Quincy, 4400 tons (including 400 tons of wheels); Chicago, Milwaukee & St. Paul, 2800 tons; St. Louis-San Francisco, 2000 tons; Wabash, 1275 tons; Chicago & Alton, 650 tons; Gulf Coast Lines, 600 tons; Monon, 450 tons; Nickel Plate, 250 tons.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	\$11.75
No. 1 locomotive tires	14.25 to 14.75
Heavy shoveling steel	11.75 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.25 to 14.75
Railroad springs	15.00 to 15.50
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	11.75 to 12.25
No. 1 bushing	10.25 to 10.75
Cast iron borings	9.25 to 9.75
Iron rails	12.50 to 13.00
Rails for rolling	15.25 to 15.75
Machine shop turnings	6.75 to 7.25
Steel car axles	19.00 to 19.50
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	20.00 to 20.50
No. 1 railroad wrought	11.00 to 11.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	12.75 to 13.25
Cast iron car wheels	13.50 to 14.00
No. 1 machinery cast	13.50 to 14.00
Railroad malleable	12.50 to 13.00
No. 1 railroad cast	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Finished Iron and Steel.—A fairly large tonnage is reported to have been taken on by a Chicago interest, which opened its books for fourth quarter at 1.90c. per lb., Chicago, on plates, shapes and bars. The Granite City mill is operating at 100 per cent capacity on galvanized sheets, for which there is a heavy demand from the South and Southwest, and on tin plate, buying of which has been much heavier than had been expected at the opening of the canning season, with its large carry-over from the preceding year. This mill's tank plate production is at 70 per cent of capacity. Mill prices are firm. It is expected that trunk lines with

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.35c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, $\frac{3}{8}$ -in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped	60
Hot-pressed nuts, hexagons, blank or tapped	60

headquarters here will be in the market soon for rails. Fabricators of structural steel report business dull. Warehouse business shows a falling off so far this month as compared with last month and the same period in 1926.

Coke.—A further improvement in the buying of coke has followed the failure of the Illinois miners and operators to settle their differences. Consumers in this district are taking in all coke due on contracts in an effort to pile up reserve stocks. Cooler weather in the past week is expected to give an impetus to the demand for domestic grades.

San Francisco

Large Lettings of Concrete Bars — Warehouse Prices Changed

SAN FRANCISCO, Sept. 24 (*By Air Mail*).—The movement of iron and steel products this week was confined to relatively unimportant tonnages in most lines, though there was a fair volume of awards of reinforcing bars and structural shapes, outstanding among which were 1000 tons of reinforcing bars for the First Street viaduct, Los Angeles, and 300 tons of shapes for an office building in Oakland, Cal. Consumers of sheets are displaying little interest in the market, following the opening of books for fourth quarter requirements. Prices, generally, are fairly firm at the established levels.

Pig Iron.—Both sales and inquiries are limited to the usual routine of small business for prompt shipment, and the market, as a whole, remains quiet. A large tonnage of Indian material is en route to Pacific ports and is to be applied against contracts placed some time ago. Prices remain unchanged.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Structural shape awards this week called for over 1300 tons and included 220 tons for a hangar for the city of San Francisco, booked by the Judson Mfg. Co. Prices on fabricated material erected are far from satisfactory because of competition by shops using foreign material. This competition is felt most keenly in projects taking 40 and 50 tons to 200 and 300 tons. Included among important projects pending is 800 tons for an office and bank building at Pasadena, bids on which are being taken. Plain material continues firm at 2.40c., c.i.f. Coast ports.

Plates.—Current plate bookings call for less-than-carload lots, and no inquiries of importance have come before the trade during the past four or five weeks. The market, at present, is quieter than it has been in over three years. As no large lots have come up to test the market, 2.40c., c.i.f. Coast ports, continues to be the prevailing price. Several large pipe line projects are being considered, but it is problematical if this business will come up for figures this year.

Reinforcing Bars.—In addition to the 1000 tons booked for a viaduct in Los Angeles, 775 tons was placed for a loft building in Los Angeles, 400 tons was secured by the Truscon Steel Co. for the Lafayette dam of the East Bay Municipal Utility District, Oakland, Cal., and 225 tons was booked by a Northern interest in connection with the construction of the Mount Diablo dam at Seattle, Wash. Bookings so far this year are

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.25c.
Soft steel bars	3.25c.
Small angles, $\frac{3}{8}$ -in. and over	3.10c.
Small angles, under $\frac{3}{8}$ -in.	3.60c.
Small channels and tees, $\frac{3}{8}$ -in. to 2 $\frac{3}{4}$ -in.	3.70c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.10c.
Black sheets (No. 24)	3.85c.
Blue annealed sheets (No. 10)	4.90c.
Galvanized sheets (No. 24)	5.45c.
Structural rivets, $\frac{1}{2}$ -in. and larger	5.75c.
Common wire nails, base per keg	\$3.35
Cement coated nails, 100-lb. keg	3.35

40 per cent in excess of what they were for the same period last year. New inquiries include 250 tons for the city of Los Angeles and 800 tons for the Fox theater, San Francisco. Out-of-stock prices in the bay district cannot be considered firm at the levels that have prevailed for the past month or so, namely, 2.75c. to 2.85c. per lb. on lots of 200 tons or more and from 3c. to 3.10c. on less-than-carload lots.

Cast Iron Pipe.—Outstanding among the awards this week were 1460 tons of 4 to 20-in., Classes B, C, 50, 150 and 250, for Bellingham, Wash., secured by the United States Cast Iron Pipe & Foundry Co. Other awards of the week involved lots of less than 100 tons each. Pending and new business includes 730 tons of 4 to 12-in., Classes A and B or 50 and 150, for Gladstone, Ore., bids on which will be opened Oct. 3; 315 tons of 4 to 10-in. Class B pipe for El Segundo, Cal., on which the Pacific States Cast Iron Pipe Co. was low bidder; 191 tons for the improvement of Fifty-fourth Street, San Diego, Cal., bids on which are in, and 183 tons for Santa Monica, Cal., for the improvement of Twenty-third Street, on which the O. F. Fisher Co. is low bidder.

Steel Pipe.—Action is expected to be taken by the Santa Maria Gas Co. next week on its inquiry for 13,000 tons of 6-in. line pipe. Bookings this week were confined to small lots. Stocks on hand in Coast warehouses are reported to be sufficient to take care of the present slack demand.

Sheets.—Lack of interest on the part of consumers in future requirements places the sheet market in a most unsatisfactory condition, and mill representatives are forced to be content with occasional orders for small carload and less-than-carload shipments. Blue annealed sheets are being quoted at 2.25c. per lb., base Pittsburgh, black sheets at 3c. and galvanized at 3.85c.

Warehouse Business.—Most distributors report heavier sales this month than in the preceding month and apparently are encouraged by the outlook for the rest of the year. Price changes have occurred both at Los Angeles and San Francisco. In the latter place the changes are as follows: On plates, shapes and bars prices have been advanced from 3.10c. to 3.25c.; structural rivets, ½-in. and larger, have been advanced from 5.50c. to 5.75c.; cement coated and common wire nails have been reduced from 3.45c. to 3.35c. The other items on the list remain unchanged.

Coke.—The movement of coke this week was confined to small lots for prompt delivery, and no large arrivals from foreign ports were noted. Prices on foundry coke are unchanged, as follows:

English beehive coke, \$15 to \$16 per net ton at incoming dock; English by-product \$12 to \$13, and German by-product, \$11.50 to \$12.

Qualities of Fire Clay Refractories

Effects of reheating fire clay and bricks at high temperatures have been observed by the Bureau of Standards. The importance of the thermal dilatation as a factor controlling resistance to thermal spalling has been studied, also.

In 9-in. brick laid up in header courses, with only the small end exposed directly to the heat, the maximum temperature 2 in. in from the hot face may never exceed 1200 deg. C., even though the hot face is held for prolonged periods as high as 1450 deg. Since the refractories are fired initially at 1250 to 1275 deg. C., it is unlikely that the structure 2 in. from the hot face would be greatly affected in service.

However, material at the hot face and immediately adjacent may be changed materially as regards thermal dilatation. Changes in the percentage of linear thermal expansion and contraction of the brick have been found under conditions of reheating at 1400 deg. C. These changes vary with the conditions. Certain brick of the siliceous type showed changes greatly above the average values.

The electric hoist business was better in August than in July, according to figures of the Electric Hoist Manufacturers' Association. The number ordered, the value of the orders and the amount of shipments exceeded July by 21.4, 54.7 and 30.9 per cent respectively.

Moderate Improvement in Sheet and Strip Business in Valleys

YOUNGSTOWN, Sept. 27.—Moderately improved business in flat rolled steel products is reported by district producers and is reflected in weekly production schedules. One important Valley sheet maker advises that newly accepted sheet tonnage is sufficient to engage the capacity of his plant for the next 30 days, with other business in sight. This week in the Mahoning Valley 92 out of 127 sheet mills started Monday, against a recent low of 60. It is unlikely, however, that all of the mills which start will complete the week. More tonnage in strips and sheets is developing from the automobile trade than heretofore, and the Ford Motor Co. has placed some important orders for strips, indicating more extensive buying at an early date for the new Ford car. One strip producer has received enough Ford strip business this month to fully occupy one large mill for 60 days.

The Trumbull Steel Co. is installing additional electrical equipment in connection with its 14-in. strip mill to enable it to roll wider material. Its 36-in. strip mill is under power and has produced material up to 30 in. in width.

Beginning Monday the A. M. Byers Co., Pittsburgh, placed its mechanical puddling plant at Warren, Ohio, on a two-turn basis, owing to the expanding needs of its skelp mills at Girard, Ohio. The Byers company has been for some time an open market buyer of material for its skelp mills. Initial experimental operations at the Warren property, with the Ashton process of producing puddled iron, have proved successful, it is understood.

Plans are being developed in an active way for the financial reorganization of the Struthers Furnace Co., which for more than a year has been in receivership. W. H. Holzworth, who acted as manager for the receiver, is negotiating the new developments. It is planned to place in operation the company's merchant blast furnace at Struthers, Ohio. The stack has been idle since early this year.

There has been some recession this week in pipe mill schedules, indicating a letting down in new pipe business. Of 20 Valley mills, 13 are scheduled, against a recent high of 15 active. New steel bar business is likewise irregular. The independents report bar capacity active at 40 per cent, and the Steel Corporation subsidiary, at 50 per cent.

Will Use German Method of Burning Silica Brick

The Harbison-Walker Refractories Co., Pittsburgh, will soon inaugurate at its East Chicago works a method of burning silica brick, which while fairly common abroad has never before been tried in this country. Three units are to be installed at that works, and later the company will build similar units at its other silica brick plants in western Pennsylvania and in Birmingham. The company has secured American rights to a German method of making silica brick, which involves the use of a car tunnel type of kiln, fired by producer gas and employing the regenerative principle. Pyrometric control is used, with draft and pressure gages, to give absolute regulation from the time the brick enters until it leaves the kiln, with a burning temperature of 2700 deg. Fahr. The kiln is 500 ft. long and it is said to be capable of producing 100 tons daily.

Dust-tight, boiler-plate inclosing cases for wall-mounted, general purpose starters are announced by the General Electric Co. These are recommended for installation in foundries, coke plants, etc.; for installations where mechanical strength is desired, such as steel mills, and for installations where protection against steam or fumes is necessary. The cases are constructed of ¼-in. boiler-plate steel with welded joints.

Greater Production but Smaller Bookings of Commercial Steel Castings

Production of commercial steel castings is reported by the Department of Commerce at 83,198 net tons, the largest month's figure since April. It compares with 75,551 tons in July and with 81,422 tons in August of last year, and represents 63 per cent of capacity.

Railroad specialties at 29,774 tons, included in the total above, made with one exception the smallest total of the year, comparing with 29,679 tons in July. In August, 1926, the amount was 26,088 tons. Miscellaneous castings, on the other hand, at 53,424 tons in August showed, with two exceptions, the highest month's total of the year. It compared with 45,872 tons in July and 53,334 tons a year ago. Capacity for turning out railroad specialties was utilized to the extent of 50 per cent in August, while miscellaneous castings capacity was used to 73 per cent.

Bookings in August at 61,369 tons represent the lowest month's total in the first eight month of the last two years. The drop from July's 72,012 tons was about 15 per cent. In August of last year the total was 68,127 tons. Similarly, for railroad specialties, the August bookings of 20,220 tons made much the lowest total of the year, comparing with 29,979 tons in July. Miscellaneous castings showed bookings of only 41,149 tons, again the lowest of the year and comparing with the previous low 42,033 tons in July.

For the eight elapsed months of the year total production has been 680,854 tons. This is more than 11 per cent under last year's 766,929 tons in eight months. Bookings in the first eight months this year, at 639,267 tons, represent more than 8 per cent under last year's total of 696,731 tons in eight months.

Slight Increase in Malleable Castings

Production of malleable castings in August is reported by the Department of Commerce from 134 identical plants at 51,394 tons. This is a gain of more than 6 per cent from the low figure of July, but is otherwise the smallest total since last December and is with three exceptions the smallest monthly total in more than two years. The July figure was 48,202 tons, while in August last year the amount was 57,541 tons.

Shipments have held close to production, having been 50,258 tons in August, against 48,265 tons in the preceding month and 57,246 tons a year ago. Orders booked in August were only 42,515 tons. This is the lowest month of the year and with two exceptions the lowest in more than two years.

For the first eight months of the year, production has been 450,692 tons, a decline of nearly 11 per cent from last year's 504,013 tons in eight months. Shipments at 440,620 tons represent a drop of 10 per cent from last year's 488,759 tons. Orders booked, which include all but a few of the smaller companies, totaled 402,913 tons in the eight months, or about 7½ per cent under last year's 434,985 tons. Capacity was utilized in August to the extent of 48.6 per cent and in the eight months, 53.2 per cent.

August Business in Steel Furniture Above July Totals

WASHINGTON, Sept. 23.—Orders for steel furniture in the business group aggregated \$2,381,889 in August, against \$2,091,804 in July, while those in the shelving group were valued at \$592,353 and \$534,875 respectively, according to the Department of Commerce. Shipments in the business group in August were \$2,474,854 compared with \$2,040,209 in July, while unfilled orders were valued at \$1,412,244 and \$1,507,120 respectively. Shipments in the shelving group in August were valued at \$604,107 as against \$565,484 in July and unfilled orders were \$668,621 and \$679,309 respectively.

Orders in the business group for the eight months ended with August were valued at \$20,655,390, compared with \$20,953,360 for the corresponding period of last year. Orders received during these two periods respectively in the shelving group were valued at \$4,997,919 and \$4,905,681.

Large Shipments of Enameled Sanitary Ware

August shipments of enameled sanitary ware are reported by the Department of Commerce at 413,065 pieces. This compares with 367,958 pieces in July and with 411,124 pieces in August of last year. Shipments of bathtubs in August, at 110,204, came close to the highest month of the year, and new orders at 106,535 practically balanced the outgoing material.

For the eight months of the year, total shipments of bathtubs have fallen off 6 per cent, from 846,168 last year to 794,834 units. Orders, similarly, have declined almost 10 per cent, from 889,551 last year to 805,674 in the current year.

Ohio Foundry Operations Gain

Members of the Ohio Foundrymen's Association reported a production of 17,559 tons of castings in August, or 86.8 per cent of a "normal" melt of 20,217 tons. Output was 72 per cent of normal in the previous month and 87.6 per cent in August, 1926. Stocks of metal received increased to 71.5 per cent of normal from 63.5 per cent in July. In August one year ago they totaled 71 per cent. Stocks on hand declined to 82.4 per cent from 94 per cent in July. The figure for August, 1926, was 84 per cent. Operations in non-ferrous foundries increased to 71.5 per cent from 69 per cent in July, comparing with 79 per cent in August a year ago.

Ohio Foundry Wages Increase

Average wages in Ohio foundries on July 1 showed slight increases for four of the principal classes of foundry help and a decline for one, according to the second quarter wage report of the Ohio State Foundrymen's Association. The wages of core makers, at 72.3c. per hour, showed a decline from 73.1c. on April 1. Iron molders at 81.1c., brass molders at 81c., pattern makers at 82.2c., and common labor at 52.6c., were all on a higher wage basis than three months before.

Employment in Metal Trades Shows Gain

Employment in shops affiliated with the National Metal Trades Association showed a gain in August, with a total of 575,473 employees reported as compared with 573,860 in July. This is the second consecutive gain following three months of recession. Among the various geographical groups, increases were reported by Michigan plants and shops in Illinois. Employment in Detroit, at 206,074, compares with 202,156 in July and 189,398 in June. Losses were reported by all the other groups, although individual cities, such as Philadelphia, Pittsburgh, Cincinnati, Hartford, Conn., and Springfield, Mass., showed gains. Total employment for August fell considerably short of the figure for August, 1926, which was 636,031.

Films of Cylindrical Grinders

Four films have been prepared by Cincinnati Grinders, Inc., giving views of installations of cylindrical grinders in a number of plants. Four machines are covered—an 8-in. saddle type grinder, a plain self-contained grinder, a plunge-cut grinder, and a self-contained universal grinder.

These films are available without charge to educational institutions, apprentice schools, foremen's clubs and engineering societies. The company will provide a special lecture to give complete technical discussion of any of these films. These are not moving pictures, but a succession of still pictures, permitting ample time to study each one.

The Federal Steel Corporation, with offices at 486 California Street, San Francisco, was recently organized to engage in the merchandising of steel. Stocks of blue annealed sheets, plates, shapes and bars are being carried in its San Francisco warehouse. H. C. Perrine is president of the corporation.

NON-FERROUS METAL MARKETS

The Week's Prices	Cents per Pound for Early Delivery	Sept. 27 Sept. 26 Sept. 24 Sept. 23 Sept. 22 Sept. 21					
		Lake copper, N. Y.	13.25	13.25	13.25	13.25	13.25
		Electrolytic copper, N. Y.* ..	12.90	12.90	12.90	12.90	12.90
		Straits tin, spot, N. Y.	58.75	59.50	...	59.50	60.55
		Lead, New York	6.25	6.25	6.25	6.25	6.25
		Lead, St. Louis	6.00	6.00	6.00	6.00	6.00
		Zinc, New York	6.50	6.50	6.50	6.52 1/4	6.55
		Zinc, St. Louis	6.15	6.15	6.15	6.17 1/2	6.20

*Refinery quotation; delivered price 1/4c. higher.

NEW YORK, Sept. 27.—With the exception of tin, buying of the metals has been very light. Prices in general tend lower. Demand for copper and zinc has been exceedingly light, but sales of tin have been fairly heavy at rapidly falling prices. Lead has been practically stationary in a rather dull market. Antimony continues to decline.

Copper.—Following the quite heavy sales to both domestic and foreign consumers reported a week ago, the copper market has turned quite inactive with one or two sellers willing to shade the quotation of 13.25c., delivered in the Connecticut Valley, which prevailed up to a week ago today. In a few cases the light demand has been satisfied at prices ranging from 13.15c. to 13.20c., delivered, and it is stated that there is one seller today willing to part with metal at 13.12 1/2c. Consumers are not needing much metal just now and are watching the course of prices. After several days of relative inactivity fairly good sales to foreign consumers are noted today, Tuesday, the price for which continues unchanged at 13.50c., c.i.f. foreign ports. While there are two or three sellers willing to do business from 13.12 1/2c. to 13.20c., most of the larger producers are adhering to 13.25c., delivered. Lake copper is quoted largely nominal at 13.25c., delivered.

Tin.—Sales for the week ended with Saturday, Sept. 24, totaled about 1500 tons, with trading mostly among dealers. At all times the metal was freely offered with nearly everybody ready to sell. The feature of the

market is the probably unfavorable statistics for October which will probably show an increase in the world's visible supply. Consumers are letting the market alone though it is conceded they must buy for November-December delivery. A waiting attitude, however, is their present policy. Early on Thursday they did some buying but were out of the market in the afternoon. On Saturday, Sept. 24, about 75 tons was sold, and yesterday, Monday, the market was active with dealers exchanging about 400 tons. Today, Tuesday, sales totaled approximately 200 tons. In general sentiment is against tin and the attitude of the market is bearish. As indicated in our report last week, supply and demand for the metal is such that prices continue to decline and spot Straits tin today is quoted at 58.75c., New York, the lowest price since June 8, 1926, when the same price prevailed. London prices today are also considerably lower than a week ago with spot standard at £266, future standard at £264 and spot Straits at £271 10s. per ton. The Singapore price today was £269 15s. Arrivals thus far this month have been 5257 tons with 7585 tons reported afloat.

Lead.—Very little change in prices or demand is noted though the foreign quotations are lower today, being reckoned as equivalent to 6.12 1/2c., New York. This has led to the expectation that the leading interest might reduce its New York contract price which at the close today still stood at 6.25c., New York. In the outside market the quotation is still 6c., St. Louis. There is very little activity in the market as a whole.

Zinc.—Semi-monthly statistics, as of Sept. 15, issued by the American Zinc Institute, show stocks of refined metal to have increased during the half month a little over 1500 tons. This fact and a general lack of demand have resulted in declining prices so that prime Western zinc today is quoted at 6.15c., St. Louis, or 6.50c., New York, and it is stated by some sellers that it might

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	62.00c. to 63.00c.
Tin, bar	64.00c. to 65.00c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.50c. to 8.50c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.75c. to 10.75c.
Antimony, Asiatic	12.00c. to 13.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure) ..	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy ..	26.00c. to 27.00c.
Babbitt metal, commercial grade ..	30.00c. to 40.00c.
Solder, 1/2 and 1/2	40.00c. to 41.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	65.75c.
Tin, bar	67.75c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	17.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	21.25c.
Babbitt metal, high grade	69.75c.
Solder, 1/2 and 1/2	37.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.25c. to 19.00c.
Copper, hot rolled	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier ..	24.25c. to 25.25c.
Seamless Tubes—	
Brass	23.12 1/2c. to 24.12 1/2c.
Copper	24.00c. to 25.00c.
Brazed Brass Tubes	26.25c. to 27.25c.
Brass rods	16.00c. to 17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

Purchasing of zinc and lead sheets is light, but brass and copper products consumed in the electrical industry and radio manufacture are moving in better volume. Prices have been unchanged since Aug. 3 on brass and copper, since Aug. 5 on zinc sheets and since Sept. 9 on lead full sheets.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets	
High brass	18.25c.
Copper, hot rolled	22.00c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.

Seamless Tubes—	
High Brass	23.12 1/2c.
Copper	24.00c.

Rods—	
High brass	16.00c.
Naval brass	18.75c.

Wire—	
Copper	15.25c.
High brass	18.75c.

Copper in Rolls	21.00c.
Brazed Brass Tubing	26.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	.....	19.25c.
Copper, hot rolled	.....	22.00c.
Copper, cold rolled, 14 oz. and heavier	.....	24.25c.
Zinc	.....	11.00c.
Lead, wide	.....	10.00c.
Seamless Tubes—		
Brass	.....	24.62 1/2 c.
Copper	.....	25.50c.
Brazed Brass Tubes	.....	28.50c.
Brass Rods	.....	16.00c.

be difficult to obtain even that price, which is largely nominal. Ore at Joplin has declined \$1 per ton during the week to \$40, with the week's output at 15,000 tons and sales about 11,600 tons, which are regarded as the normal requirements at present.

Antimony.—Prices continue to weaken and Chinese metal for all positions is quoted at 10.50c., New York, duty paid, with demand light.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 26c., delivered.

Nickel.—Wholesale lots of ingot nickel are quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 27.—This market is dull and all prices are lower with the exception of copper. The old metal market is quiet and prices are weak.

Prices, per lb., in carload lots: Lake copper, 13.35c.; tin, 62c.; lead, 6.10c.; zinc, 6.30c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

FABRICATED STRUCTURAL STEEL

Week's Awards Close to 24,000 Tons—About 30,000 Tons Added to Pending Business

The week in the structural steel trade brought awards totaling close to 24,000 tons and additions to the list of pending business amounting to 30,000 tons. The largest awards were 7200 tons for a power house at Hammond, Ind., and 6000 tons for the Grant Building in Pittsburgh, while 10,000 tons for a new City Hall in Buffalo is the outstanding item in new business. A bridge at Bristol, R. I., calls for 4000 tons, but the project is still in a tentative stage. Awards follow:

WELLESLEY, MASS., 160 tons, dormitory, to New England Structural Co.
PROVIDENCE, R. I., 500 tons, Union Trust Co. Building, to an unnamed fabricator.
NEW YORK, 1500 tons, apartment building at Park Avenue and Eighty-first Street, to A. E. Norton, Inc.
NEW YORK, 1000 tons, apartment building for Bing & Bing, to Hedden Iron Construction Co.
NEW YORK, 1500 tons, apartment building at Lexington Avenue and Eighty-eighth Street, to Easton Structural Steel Co.
BROOKLYN, 150 tons, garage, to an unnamed fabricator.
BROOKLYN, 600 tons, public library, to Fort Pitt Bridge Co.
ELMIRA, N. Y., 175 tons, addition to Elmira Reformatory, to Kellogg Structural Steel Co.
PHILADELPHIA, 150 tons, building for Stephen Girard Estate, to an unnamed fabricator.
BALTIMORE & OHIO RAILROAD, 700 tons, bridge at Middletown, Ohio, to McClintic-Marshall Co.
CHARLOTTESVILLE, VA., 200 tons, medical building for University of Virginia, to an unnamed fabricator.
PITTSBURGH, 6000 tons, Grant Building, to American Bridge Co.
LOUISVILLE, 1000 tons, building for Brown & Williamson Tobacco Co., to McClintic-Marshall Co.
LOUISVILLE, 500 tons, plant addition for Henry Vogt Machine Co., to McClintic-Marshall Co.
KNOXVILLE, TENN., 550 tons, Volunteer Portland Cement Co., to Ingalls Iron Works Co., Birmingham.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.50c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.25c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	7.75c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.125c.	5.375c.
Lead, tea	4.25c.	4.75c.
Zinc	4.00c.	4.50c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

HODGE, LA., 650 tons, Advance Bag Paper Co., to Ingalls Iron Works Co.
CLEVELAND, 250 tons, Habermann Provision Co., to Republic Structural Iron Works.
CLEVELAND, 500 tons, Union Terminals Co., Broadway bridge, to Fort Pitt Bridge Works.
CHICAGO, ROCK ISLAND & PACIFIC RAILROAD, 100 tons, deck girder spans, to American Bridge Co.
NEW ORLEANS, 200 tons, Todd Dry Docks & Shipbuilding Co., to Ingalls Iron Works Co.
HAMMOND, IND., 7200 tons, power house for State Line Generating Co., to McClintic-Marshall Co.
HAMMOND, 420 tons, boiler supports for State Line Generating Co., to Vierling Steel Works, Chicago.
CHICAGO, 100 tons, railroad work, to Vierling Steel Works, Chicago.
SAN FRANCISCO, 220 tons, hangar at Millbrae for city of San Francisco, to Judson Mfg. Co.
SAN FRANCISCO, 170 tons, apartment house at Broadway and Franklin Street, to Central Iron Works.
OAKLAND, CAL., 295 tons, addition to an office building on Franklin Street, to Herrick Iron Works.
BEVERLY HILLS, CAL., 150 tons, addition to the telephone building, to McClintic-Marshall Co.
PASADENA, CAL., 150 tons, church, to an unnamed company.
LOS ANGELES, 100 tons, building for the University of California, to an unnamed fabricator.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BETHEL, ME., 200 tons, bridge.
MALDEN, MASS., 100 tons, junior high school.
BRISTOL, R. I., 4000 tons, Mount Hope bridge; tentative.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 200 tons, bridge.
NEW YORK STATE, 1700 tons, highway bridges; bids go in Oct. 6.
ALBANY, N. Y., 225 tons, building for State Department of Health.
WHITE PLAINS, N. Y., 150 tons, Y. M. C. A. building.
PENNSYLVANIA RAILROAD, 150 tons, bridge.
NORFOLK, VA., 6400 tons, James River bridge connecting Norfolk and Newport News; general contract awarded to Turner Construction Co.
BUFFALO, 10,000 tons, new City Hall; bids in November.
DUBUQUE, IOWA, 200 tons, coke plant for U. G. I. of Philadelphia.
CHICAGO, 1500 tons, addition to Great Northern Trust Building.
ELYRIA, OHIO, 250 tons, building for Colson Mfg. Co.
CHICAGO, 215 tons, plant for Devoe & Reynolds Co.
MINNEAPOLIS, 500 tons, second section of Foshay Tower building.
CHICAGO, 1000 tons, Schedd Aquarium.
PEKIN, ILL., 650 tons, building for Fleischman company.
PULLMAN, ILL., 400 tons, theater.
MILWAUKEE, 1700 tons, city section of new Milwaukee County Safety Building; S. M. Siesel Co., 160 Ogden Avenue, Milwaukee, low bidder.
PASADENA, CAL., 800 tons, office building; bids being received.

Yates-American Machinery Co., Rochester, N. Y., reports for the fiscal year ended June 30, 1927, a deficit of \$342,641 after all charges, compared to the net income of the previous fiscal year of \$587,106, after interest, depreciation and Federal taxes, which was equal to \$4.35 a share on the participating preferred stock.

REINFORCING STEEL

Awards of 7500 Tons Include One of 1000 Tons —Inquiries for 3800 Tons

Awards of steel for concrete reinforcement within the week totaled about 7500 tons, the largest of which was 1000 tons for a viaduct in Los Angeles. New work up for bids totals about 3800 tons, of which 2000 tons is for a bridge at Norfolk, Va. Awards follow:

PHILADELPHIA, 815 tons, building for General Baking Co., to Kalman Steel Co.
NEW YORK, 250 tons, loft building on East Forty-seventh Street, to Kalman Steel Co.
BOUND BROOK, N. J., 125 tons, factory for Ruberoid Co., to Igoe Brothers.
CHICAGO, 450 tons of rail steel bars, Cook County road work, to Calumet Steel Co.
CHICAGO, 160 tons, public school, to Jones & Laughlin Steel Corporation.
CHICAGO, 100 tons, Bryn Mawr Beach Hotel, to American System of Reinforcing.
CHICAGO, 165 tons, public school, to Olney J. Dean & Co.
ROCKFORD, ILL., 600 tons, hotel, to an unnamed bidder.
CLEVELAND, 600 tons, Broadway bridge for Union Terminals Co., to Pattison-Leitch Co.
BRYN MAWR, PA., 205 tons, Bryn Mawr Hospital to Electric Welding Co.
SCRANTON, PA., 150 tons, Greenridge Street viaduct, to Central Clay Product Co.
CHICAGO, 125 tons, Clemans Garage, to Joseph T. Ryerson & Son.
CHICAGO, 561 tons, Manly Junior High School, to Concrete Steel Co.
CHICAGO, 165 tons, Spaulding public school, to an unnamed bidder.
CHICAGO, 110 tons, public school, to an unnamed bidder.
DALLAS, TEX., 350 tons, slabs for floors in Southwestern Bell Telephone Building, to Laclede Steel Co.
LOS ANGELES, 1000 tons, First Street viaduct, to an unnamed company.
LOS ANGELES, 775 tons, loft building on Los Angeles Street, to an unnamed company.
GLENDALE, CAL., 110 tons, Masonic Lodge, to an unnamed bidder.
OAKLAND, CAL., 400 tons, Lafayette Dam, to Truscon Steel Co.
MERCED, CAL., 100 tons, bank, to Badt-Falk Co.
SEATTLE, 225 tons, Mount Diablo Dam, to an unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PHILADELPHIA, 265 tons, Hellerman Street sewer.
YONKERS, N. Y., 214 tons, warehouse for Feuer's Warehouse & Trucking Co.
NORFOLK, VA., 2000 tons, James River bridge connecting Norfolk and Newport News; general contract awarded to Turner Construction Co.
CHICAGO, 150 tons, Washington Park substation for Commonwealth Edison Co.
CHICAGO, tonnage being estimated, Schedd Aquarium.
CHICAGO, tonnage being estimated, Chicago Daily News building.
SAN FRANCISCO, 800 tons, theater, Market and Larkin Streets; bids being taken.
SAN FRANCISCO, 100 tons, arena, Post and Steiner Streets; bids being taken.
LOS ANGELES, 250 tons, for city work; bids Oct. 10.

RAILROAD EQUIPMENT

Pere Marquette May Buy 500 to 1000 Box Cars— Packing Company Inquires

For the first time in many weeks a sizable inquiry for freight cars is being figured on by car builders. The Pere Marquette is expected to buy from 500 to 1000 box cars. Another inquiry is for 200 refrigerator cars for a packing company. Items in detail follow:

The Pere Marquette may buy 500 to 1000 box cars.
The Carnegie Steel Co. has ordered 40 tank cars from the American Car & Foundry Co.
The New River & Pocahontas Consolidated Coal Co. has ordered 150 mine cars from the Watt Car & Wheel Co.
The Louisiana & Arkansas has ordered eight 40-ton steel underframe flat cars from the American Car & Foundry Co.
The Solvay Process Co. has ordered 33 tank cars from the American Car & Foundry Co.
The Cudahy Packing Co. is in the market for 200 refrigerator cars.
The Great Northern has placed 200 underframes with the Seims-Stemle Co.
The St. Louis Southwestern will buy 10 underframes.

METAL-WORKING MACHINERY

Exports in 1926 Below 1925 but Now Gaining in Important Markets

UNITED STATES exports of metal-working machinery amounted to \$18,868,000 in 1926—a decline of more than \$3,000,000 from the large volume of 1925—but considerably greater than for any other year since 1921. Shipments for the first half of 1927, not yet available by countries of destination, at \$11,049,000, suggest that the current year may exceed 1925.

Since 1923, Europe has been taking 50 per cent or more of our total foreign shipments of metal-working machinery. In 1926 the proportion was 51.4 per cent—slightly more than in 1924 but considerably less than in 1925, when it stood at 62 per cent. Europe's total purchases in 1926 were \$9,694,000—nearly 30 per cent below 1925, but above any other year since 1920.

Latin American industries are absorbing more machinery. Purchases in 1926, amounting to \$2,718,000, practically the same as in 1925, greatly exceeded any other year since 1921. Compared with this volume, the average of \$637,000 for 1910 and 1913 makes a striking contrast, even allowing for increased prices.

Exports of metal-working machinery to Mexico and Central America during 1926 were the largest since 1921. Purchases by the West Indies, however, fell off sharply, amounting to only \$273,000, compared with \$409,000 in 1925, and the smallest volume since pre-war years. This decline was probably due in large part to the business depression in Cuba.

Asiatic purchases of American industrial machinery have been decreasing since the trade expansion which ended in 1921. In 1926, this region absorbed \$1,638,000, compared with \$2,581,000 in 1924. There has

been a large increase over pre-war years, as a result of the trend toward industrialization which has been in evidence in Asia since the outbreak of the war.

An increasing amount of industrial machinery has been purchased by Australasia during recent years, culminating in \$1,163,000 for 1926, exceeding that for any previous year. Similarly, Australasia has been absorbing an increasing proportion of total United States exports, amounting to more than 6 per cent of all in 1926, or double the proportion of pre-war years.

WORLD MARKETS FOR AMERICAN METAL-WORKING MACHINERY

(Thousands of Dollars Exported to Destinations Indicated)					
Country	1926	1925	1924	1923	1922
United Kingdom.....	\$4,654	\$4,053	\$3,128	\$2,451	\$2,147
Canada	3,215	2,328	1,752	2,957	1,641
France	1,582	2,429	2,059	1,092	1,035
Germany	1,018	2,886	545	209	77
Australia	918	841	639	639	416
Japan	874	1,205	1,981	1,485	1,481
Mexico	638	557	352	586	449
Russia	538	888	228	31	1
Italy	515	1,725	304	142	82
British India.....	461	362	337	718	2,405
Chile	419	485	213	188	206
Brazil	383	299	187	200	241
Argentina	252	325	215	204	159
Cuba	209	309	346	383	239
Philippines	73	53	74	45	58
Panama	34	70	47	27	11
Other South America					
(a)	556	501	295	252	247
Other Latin America					
(b)	86	116	83	77	48
Other Europe (c)....	1,373	1,686	1,050	903	601
Other East (d).....	776	583	482	348	482
Total, including coun- tries not mentioned	18,868	22,037	14,590	13,105	12,209

(a) Bolivia, Colombia, Peru, Uruguay and Venezuela.
(b) Dominican Republic, Guatemala, Honduras and Salvador.
(c) Austria, Belgium, Czechoslovakia, Denmark, Finland, Greece, Hungary, Netherlands, Norway, Poland, Spain, Sweden and Switzerland.
(d) Portuguese East Africa and British South Africa.

PERSONAL

Frederic Leake, vice-president Tennessee Products Corporation, Nashville, Tenn., was elected president at a recent meeting of the board of directors at New York.



FREDERIC LEAKE

He entered the service of the Bon Air Coal & Iron Corporation when it was first organized, and was secretary of that company when it was taken into the merger now known as the Tennessee Products Corporation. William J. Cummins was reelected chairman of the executive committee; John McE. Bowman, treasurer, was elected vice-president; Dr. W. B. Young, general superintendent coal division, was also elected a vice-president; Alvin Foster, assistant treasurer, was elected secretary and treasurer. James R. O'field, Chicago, vice-chairman board of directors, was advanced to chair-

man. William J. Cummins, chairman of the executive committee, was the founder and is still the guiding spirit of the corporation. In January, 1926, the Bon Air corporation, of which he was head, purchased the Chattanooga Coke & Gas Co. and the J. J. Gray ferro-phosphorus furnace, and merged them with the Bon Air Coal & Iron Corporation and the Bon Air Chemical Co. into the Tennessee Products Corporation.

Nathan A. Middleton and Charlton G. Eden have formed a partnership under the style of Middleton, Eden & Co., with office at Cleveland, to sell manufactured products to manufacturers, to develop sources of supply and to finance and merge industrial corporations. Mr. Middleton was for a number of years chief of the engineering department of Hornblower & Weeks, bankers and brokers, Boston, New York, Chicago, etc. Mr. Eden's experience has been in the sale of a number of manufactured products. The organization maintains an engineering department for research and design, to secure efficient costs of manufacture, and offers its services in the development of patents.

Frank A. Headson has resigned as general superintendent of the Johns-Manville, Inc., plant at Waukegan, Ill. J. P. Kottcamp, plant superintendent, succeeds Mr. Headson.

T. F. Barton of the central station engineering department of the General Electric Co., Schenectady, has been appointed engineer of the New York district, with headquarters at 120 Broadway. J. B. Bassett of the New York office has been named executive engineer of the New York district.

L. H. Korndorff, former vice-president, has been elected president of the Federal Shipbuilding & Dry Dock Co., vacant since the death of Judge Gary.

N. R. Crawford, for several years director of sales for the Industrial Works, Bay City, Mich., has resigned, effective Oct. 1. No announcement has been made as to his future connection.

F. C. Severin of the Severin-Tripp Machinery Co. and A. F. Strafer, both of New York, have consolidated their separate businesses, forming a new company which will be known as the Severin-Strafer Machinery Corporation. Both have long been associated

with the machine-tool business. They have acquired the warehouse and shop formerly occupied by the Jersey City Machinery & Supply Co. in Jersey City.

Charles W. Valentine, for a number of years vice-president Bagley & Sewall Co., Watertown, N. Y., has been elected president to succeed the late Stuart D. Lansing. Edward S. Lansing, for some time assistant to the late president (his father), was elected vice-president. Clarence E. Kinne, secretary, becomes a vice-president. Carroll Thompson, assistant treasurer, becomes secretary to succeed Mr. Kinne, also retaining his position as assistant treasurer. Charles D. Bingham was reelected treasurer.

J. R. Edwards, who has been western district sales manager Pittsburgh Steel Products Co., has resigned that position to become general manager of sales Erie City Iron Works, Erie, Pa. Mr. Edwards has been identified with the steel industry for the past 14 years, and all of that time has been engaged in the sale of tubular products. Before joining the Pittsburgh Steel Products Co. in 1921 as special sales representative, he had been with the Reading Iron Co., Reading, Pa., and the A. M. Byers Co., Pittsburgh, in sales capacities.

J. C. Fitzpatrick has been appointed district manager of sales of the Chicago Pneumatic Tool Co., with offices at 1241 East Forty-ninth Street, Cleveland, succeeding J. L. Westenhaver, who has resigned to enter into business for himself.

L. J. Skinner, one of the organizers of the Skinner Chuck Co., New Britain, Conn., in 1887, and its president since 1923, has been made chairman of the board. S. W. Parsons, for 23 years associated with the Stanley Works, has been made president of the Chuck company.

Theodore W. Robinson, vice-president Illinois Steel Co., Chicago, will return to this country Sept. 30 from a trip to Europe, where, on Sept. 21, he addressed the Iron and Steel Institute at Glasgow, Scotland.

Samuel Mather, Cleveland, has returned from an absence of some months in Europe.

Axel Sahlin, retired consulting engineer, now living in Monte Carlo, has been traveling the past few weeks through Canada in connection with the recent Empire mining and metallurgical congress.

Percival Johnson, president Pulaski Iron Co., Real Estate Trust Building, Philadelphia, has returned from a European trip.

L. R. Stewart, for many years in charge of structural and plate sales for the Bethlehem Steel Co. in the Philadelphia district, has been transferred to the general sales office for shapes and plates at Bethlehem, Pa. He is succeeded at Philadelphia by F. von Hiller, recently sales representative for the Bethlehem Steel Co. in Mexico. Prior to that Mr. von Hiller was with the Consolidated Steel Corporation, the former export selling company of the independent steel makers, and he was with the Pennsylvania Steel Co. at the time it was acquired by the Bethlehem Steel Co.

Ralph Blazo, who has been engaged in the selling of pig iron in the East for many years and who recently was associated with Walter A. Barrows, 3rd, Philadelphia, has joined the Philadelphia sales organization of Hickman, Williams & Co., which has the sales agency for pig iron made by Witherbee, Sherman & Co., Port Henry, N. Y.

Automotive production this year, according to *Automotive Industries*, will be around 15 per cent under the record-breaking year of 1926. This is approximately the rate at which the industry fell below in the first eight months of the year and the prospect that Ford production will add little to the total until the closing weeks of the year does not promise a very large fourth quarter.

S. B. Sheldon Becomes President of Minnesota Steel Co.

Samuel B. Sheldon, for the past seven years vice-president of the Minnesota Steel Co., Duluth, was elected president of the company at a recent meeting of the board of directors, becoming successor in that office to the late Elbert H. Gary. L. C. Reis, who has been with the company for fourteen years, was elected vice-president to succeed Mr. Sheldon. Messrs. Sheldon and Reis are well known in the steel trade, having virtually grown up in steel works operating departments.

Mr. Sheldon was trained at the Massachusetts Institute of Technology and his first position, which he took in 1889, was as assistant chemist at the Milwaukee works of the Illinois Steel Co. Later he was an open-hearth melter and for several years he was connected with the Ohio Steel Co. at Cleveland, first as chief chemist and later in succession as superintendent of the Bessemer and open-hearth departments of the Otis works. In 1899 he was made assistant general superintendent of the Joliet works of the Illinois Steel Co., and two years later became general superintendent. From 1903 to 1909 he was general superintendent of the Lackawanna Steel Co. at Buffalo. Afterward he went with the Bethlehem Steel Co. on special work and then for several years was engaged in consulting engineering. He became general superintendent of the Minnesota Steel Co. and later vice-president in succession to George L. Reis.

OBITUARY

BRADLEY S. MCINTOSH, Barneveld, N. Y., who was drowned by the capsizing of a speedboat near Port Dover, Ontario, on Sept. 20, was the founder of the Trenton Die & Tool Co., Barneveld. So successful was that venture that four years ago he increased the capacity of the plant and formed the Square Stamping Co.

JOHN MCKEEFREY, 90, senior member of the McKeefrey Iron Co., died Sept. 25 from infirmities of age. He established the company bearing his name 37 years ago. In addition, Mr. McKeefrey was interested in other iron-making properties in the Pittsburgh district.

CHARLES E. MILLER, manager of the Miller Furnace Co., Grand Rapids, Mich., died Sept. 19 following an illness of six weeks. He was born in Grand Rapids in 1859 and received his early education in the schools of that city. He was associated with the hardware trade and was a manufacturer of furnaces for 50 years.

ARTHUR E. CLIFFORD, Wynnewood, Pa., business manager of *Automotive Industries*, Philadelphia, dropped dead in the Union Station, Cleveland, on Sept. 20. He was 59 years of age. Mr. Clifford was for many years, beginning about 1892, connected with the McGraw Publishing Co. and its successor, the McGraw-Hill Publishing Co., Inc., as business manager of the *American Electrician* and the *Electrical World*. In December, 1923, he resigned the position he then held as assistant to President James H. McGraw to join the business staff of *Automotive Industries*, at that time published in New York.

CHARLES FERRIS JEMISON, until recently vice-president and treasurer of the Penn Seaboard Steel Corporation, now in receivership, died suddenly on Sunday, Sept. 11, while attending church services in Philadelphia. Only three weeks prior to his death he had joined the N. & G. Taylor Co., Philadelphia, as secretary and treasurer. He was for 18 years with the Penn Seaboard Steel Corporation and its predecessor, the Penn Steel Castings Marine Co., Chester, Pa. He was born at New Castle, Del., and was 52 years of age.

Will Elect Iron and Steel Institute President Friday

The board of directors of the American Iron and Steel Institute will meet in New York Friday, Sept. 30, and it is expected a new president will then be elected to succeed the late Judge Gary. Sentiment has recently been developing to bestow the honor on Willis L. King, vice-president Jones & Laughlin Steel Corporation, as mentioned in *THE IRON AGE* of Aug. 25. Mr. King heads the list of the three vice-presidents of the institute, and the views expressed were that it would be fitting to recognize, by elevating him to the office, the contributions he has been making to the industry in the fifty-eight years he has passed in it.

It may now be said that it is unlikely that he would accept the presidency, solely for personal reasons, and the supposition is that the presidency would then be offered to the next vice-president, Charles M. Schwab, chairman of the Bethlehem Steel Corporation. The third on the list of vice-presidents is John A. Topping, chairman of the Republic Iron & Steel Co.

Testing Engineers Meet in Holland

(Concluded from page 883)

was a résumé of his well-known researches on trying to get at the value of castings by testing them as such and by means of small rods cut out of the several sections of castings with a hollow drill. Much of the paper was of a theoretical nature, and much time was consumed in its presentation and discussion.

Lucas High-Power Metallography

The platform was then given to Dr. Francis F. Lucas, New York, of the Bell Telephone Laboratories, who presented the undoubtedly most interesting paper of the Congress, in showing his achievements in high-power metallography and the use of the ultra-violet microscope for the study of steel, lead and other metals.

The usual magnification in metallographical work is taken as a maximum at 1400 diameters. Dr. Lucas, by changes in the construction of the lenses in the objectives and more particularly in perfecting the preparation of the test specimens, and a new form of illumination worked out by Zeiss, was able to get perfect pictures with enlargements of 3500 to 5000 diameters. The general range of his many photographs shown was from 3000 to 4000 diameters.

With such increases in resolving the microstructure of polished steel surfaces, and with the additional knowledge gained by using the ultra-violet microscope, some of our conceptions of the structure of martensite and troostite will have to undergo a revision. This was brought out in the discussion that followed, and in which Drs. Benedicks, Rosenhain, Bain and other well-known metallographists participated. Dr. Lucas also described his method of slicing away an extremely thin layer of lead from cable covering sheets, and thus obtaining a most desirable surface for study on removal of this layer. On all hands it was admitted that a new impetus will have been given to the study of metallography by the developments worked out by Dr. Lucas.

Standard Analytical Samples

Circular No. 25 (Ninth Edition) of the Bureau of Standards gives an account of the manner in which the standardized samples are prepared and sold. It is worthy of note that this activity previous to 1905 was under the auspices of the American Foundrymen's Association, and today the active cooperation of that organization, together with the American Steel Manufacturers' Association, the Institute of Metals and the United States Steel Corporation is available.

In general, the analyzed samples of commercial grades of materials, the samples of materials of great purity and of materials of definite composition are useful to check analytical procedures and to study new methods of analysis.

Exports Fall While Imports Gain

August Shows Lower Exports and Higher Imports Than July, but 8-Month Exports Are Above Last Year and Imports Below 1926

WASHINGTON, Sept. 27.—Exports of iron and steel in August of the present year declined to 175,636 gross tons from 190,502 tons in July, while imports increased to 68,386 tons compared with 61,112 tons. For the eight months ended August, 1927, exports aggregated 1,498,006 tons, compared with 1,395,006 tons for the corresponding period of last year. Imports for the first eight months of 1927 showed a drop to 513,430 tons, from 786,015 tons for the corresponding period of 1926.

The heaviest export movement in August was of scrap, outgoing shipments amounting to 23,376 tons, of which 10,500 tons went to Danzig and Poland. There were declines in the August export movement of black and galvanized sheets, tin plate and boiler tubes and welded pipe, when compared with July, while gains were made in steel bars, plates and structural shapes. The increase in exports during the first eight months of the current year compared with last year was reflected in a number of products. They included pig iron, scrap, ingots and semi-finished steel, black sheets, tin plate, rails, boiler tubes and welded pipe and car

wheels and axles. Losses were made in exports of a number of products, including steel bars, wire rods, galvanized sheets, plain structural shapes, plain wire and bolts, nuts and rivets.

Increases in imports in August over July were reflected in pig iron, ferromanganese, scrap, steel bars, wire rods, structural shapes and cast iron pipe. Declines were shown in ingots and semi-finished steel, iron bars, sheets, skelp, wrought pipe and wire. The sharp decline in imports during the eight months of the present year when compared with the corresponding period of last year was reflected chiefly in pig iron, which fell to 85,280 tons as against 376,000 tons. The principal gains were in structural shapes, cast iron pipe and wrought iron and steel pipe.

Noteworthy in the eight-month movement, compared with last year, were the doubling of both pig iron and scrap exports, a gain of 39 per cent in shipments of tin plate and shrinkages in both steel bars and structural steel. On the import side, there was a heavy drop in ferromanganese and in semi-finished steel.

Exports of Iron and Steel from the United States
(In Gross Tons)

	August		Eight Months Ended August	
	1927	1926	1927	1926
Pig iron.....	4,854	2,744	31,575	14,455
Ferromanganese	138	61	529	405
Scrap	23,376	5,943	144,928	77,259
Pig iron, ferroalloys and scrap	28,368	8,748	177,032	92,119
Ingots, blooms, billets, sheet bar, skelp....	9,072	13,351	59,023	56,307
Wire rods.....	1,612	1,086	10,903	11,502
Semi-finished steel....	10,684	14,437	69,926	67,809
Steel bars.....	10,050	10,005	75,966	90,029
Alloy steel bars.....	284	271	3,736	3,562
Iron bars.....	243	579	3,356	3,138
Plates, iron and steel.	12,385	13,389	93,946	92,484
Sheets, galvanized...	10,936	14,060	111,983	117,281
Sheets, black steel...	12,283	7,427	118,657	115,881
Sheets, black iron....	1,436	987	11,577	12,939
Hoops, bands, strip steel	2,480	2,602	31,027	32,648
Tin plate; terne plate	16,119	17,788	188,730	136,327
Structural shapes, plain material.....	14,086	18,764	93,345	107,161
Structural material, fabricated	7,854	6,062	44,536	56,817
Steel rails	12,534	20,133	123,675	111,362
Rail fastenings, switches, frogs, etc.	2,996	3,524	25,016	27,940
Boiler tubes, welded pipe and fittings...	16,095	18,356	188,723	178,681
Plain wire.....	2,287	2,097	21,830	23,959
Barbed wire and woven wire fencing	5,212	3,800	33,846	39,347
Wire cloth and screening	200	160	1,570	1,370
Wire rope.....	338	317	3,086	3,219
Wire nails	728	830	5,493	8,258
Other nails and tacks	893	606	5,711	5,749
Horseshoes	62	101	347	448
Bolts, nuts, rivets and washers, except track	1,202	900	8,161	9,221
Rolled and finished steel	130,703	142,758	1,194,317	1,177,821
Cast iron pipe and fittings	1,819	2,003	17,923	22,872
Car wheels and axles	999	884	12,026	10,794
Iron castings	1,131	1,017	7,860	6,359
Steel castings.....	603	488	5,336	5,709
Forgings	222	267	3,491	1,990
Castings and forgings	4,774	4,659	46,636	47,724
All other.....	1,107	986	10,095	9,533
Total	175,636	171,588	1,498,006	1,395,006

Imports of Iron and Steel into the United States
(In Gross Tons)

	August		Eight Months Ended August	
	1927	1926	1927	1926
Pig iron.....	14,084	26,538	85,280	376,000
Ferromanganese*	4,062	3,523	19,214	27,332
Ferrosilicon†	581	1,988	6,437	7,462
Ferrochrome‡ .....	.....	.....	382	351
Scrap	4,681	13,505	41,863	49,475
Pig iron, ferroalloys and scrap	23,408	44,654	153,176	460,620
Steel ingots, blooms, billets and slabs....	951	1,309	8,608	22,265
Iron blooms, slabs, etc. ....	.....	281	.....	323
Wire rods	2,597	817	10,987	6,216
Semi-finished steel....	3,548	2,407	18,695	28,804
Rails and splice bars...	1,133	6,579	11,847	42,919
Structural shapes....	16,079	12,620	104,021	71,054
Boiler and other plates	496	27	3,224	3,593
Sheets and saw plates	391	1,465	9,555	5,249
Steel bars	6,926	8,822	63,447	71,494
Bar iron	189	746	2,996	4,047
Hoops, bands and cotton ties	3,863	3,472	24,002	15,665
Tubular products (wrought)	2,587	1,248	41,724	17,027
Nails, tacks, staples..	539	856	4,545	3,222
Tin plate	35	7	958	2,014
Bolts, nuts, rivets and washers	65	32	249	294
Round iron and steel wire	196	265	2,919	2,654
Barbed wire	111	160	3,082	2,331
Flat wire; strip steel.	199	486	1,805	2,599
Steel telegraph and telephone wire .....	.....	.....	31	121
Wire rope and strand.	140	293	1,660	1,868
Other wire	13	108	304	1,329
Wire cloth and screening .....	.....	9	.....	246
Rolled and finished steel	32,962	37,195	276,369	247,286
Cast iron pipe.....	8,343	7,165	63,274	47,124
Castings and forgings	125	157	1,916	1,741
Total	68,386	91,578	513,430	786,015
Manganese ore*	22,964	41,075	230,797	275,669
Iron ore	303,586	259,151	1,879,180	1,741,982
Magnetite .....	.....	4,604	53,524	57,941

*Manganese content only.

†Silicon content only.

‡Chromium content only.

HUGE MINERAL PRODUCTION

Valued in 1926 at 6¼ Billions—Probably The Greatest Output Ever Made

WASHINGTON, Sept. 24.—The aggregate value of the output of metals in the United States in 1926 showed a small increase over 1925, and among the metals of major importance, the most notable large increase was shown by zinc, according to Frank J. Katz, chief engineer, Division of Mineral Statistics, Department of Commerce. In 1926, industries producing minerals in the United States and preparing or reducing them for use were, as a whole, maintained at a higher level of productivity than during 1925.

Measured by total value of mineral products, \$6,262,000,000, the output last year was the largest ever recorded. Although the corresponding figure for 1920 was \$6,981,340,000, price levels have declined so since that peak year that the real value of the nation's mineral production for 1926 represents at least an appreciable, if not a substantial, increase over 1920.

In magnitude of production, the iron and steel industry, the review says, had a remarkable year in 1926. The production of steel was the largest ever recorded, and the production of pig iron was only a little less than in 1923, the record year. The output of iron ore was notably greater than in 1925 but still well below 1917, the banner year. The outstanding features with respect to manganese in 1926 were the smaller domestic production of high-grade ores, the extraordinary figures for the production of ferromanganese based on imported ores, the stable demand for manganese and

manganese products, and the downward tendency of prices. There was virtually no production of chromite in the United States in 1926, but important increases in imports and the growing use of chromite as a refractory material are noted.

Domestic production of copper increased moderately. Imports of copper into the United States were larger, whereas the slackening foreign demand is indicated by smaller exports. A marked increase in domestic demand, however, was insufficient to offset these factors, and domestic stocks increased. The lead and zinc industry in 1926 was characterized by record production, intense activity, high prosperity, and excellent demand, although price levels were slightly lower than in 1925 and declined during the year.

Better appreciation of the importance of minerals, the report says, is developed, for example, by realizing that the mineral raw materials of domestic origin constitute more than half, and, plus the products thereof in the first stages of manufacture, more than two-thirds, of the freight handled by the railroads of the country; "that steel, which supplies the framework and the thews of our body economic as well as politic, is the product of the iron ore and coal mines; and that the supply of energy available and utilized in this country, a vital factor in our industrial supremacy and high standard of living, is nearly 90 per cent derived from mineral fuels."

Detailed information on production in 1926 is contained in the preliminary summary of "Mineral Resources of the United States," for that year, just published by the Bureau of Mines, copies of which may be obtained from the Superintendent of Documents, Washington, at 20c.

Consumption of Fuels by Public-Utility Power Plants

Electricity produced at public-utility power plants in 1926 totaled 73,791,000,000 kwhr., according to a statement of the United States Geological Survey. Of this total, 47.6 billion kwhr., or 64.5 per cent, was generated by the use of fuels and the remainder by the use of water-power. Of the 47.6 billion kwhr. produced by the use of fuels, 42.6 billion, or 90 per cent, was generated by the use of coal alone; the remainder was generated by the use of fuel oil, gas and wood.

Average rates of consumption of fuels in generating electricity in the United States in 1926 were as follows: Coal, 1.94 lb. per kwhr.; oil, 243 kwhr. per barrel; gas, 22.1 cu. ft. per kwhr. The best fuel rates for these different fuels were about as follows: Coal, 0.9 lb. per kwhr.; oil, 450 kwhr. per barrel; gas, 13 cu. ft. per kwhr. As these are roughly one-half the average rates, the consumption of fuel by electric public-utility power plants would be reduced one-half if all public-utility power plants produced electricity at the best fuel rates, and the attainment of this degree of efficiency would have conserved more than 20,000,000 tons of coal in 1926, representing a value of about \$75,000,000.

Brass Consumption Doubled by Research

Systematic use of research during the last five years is believed by the Copper and Brass Research Association to have been largely responsible for doubling the consumption of copper during that period. New England brass and copper manufactured products advanced from 750,000 net tons in 1922 to nearly 1,500,000 tons in 1926. A typical example has been the stimulation in the use of brass pipe, which has gone up from 8000 net tons in 1922 to nearly 27,000 tons in 1926.

First the association ascertained the amount of brass pipe the industry was capable of producing and the actual maximum production. Channels of distribution were then studied and it was found that practically no aggressive work was being done to promote sales. Actual and potential markets were next studied, to determine means of inducing customers to buy a product of which the first cost was approximately three times that of the iron pipe commonly used.

Some Improvement in Locomotive Shipments

August shipments of railroad locomotives are reported by the Department of Commerce at 81, compared with 60 (revised figure) in July and with 89 in June. In August of last year the total was 124, and no month of 1926 fell below that figure. For the eight elapsed months of the year 711 locomotives have been shipped, compared with 1157 in the first eight months of 1926.

Of the total this year 595 represent steam engines, of which 108 were for export. Electric locomotives numbered 116, including seven for export. Unfilled orders at the end of August were for 363 units, compared with 399 a month earlier and 525 a year earlier. Of the current orders, 244 steam and 68 electric are for domestic service, while 30 steam and 21 electric are for export.

Large Gain in Agricultural Implement Exports

A large gain was made in exports of agricultural implements from the United States in July, as compared with July, 1926, according to the Department of Commerce. Shipments in the current month amounted to \$9,666,430 against \$7,313,569 last year. The increase, however, amounting to approximately \$2,350,000, was not sufficient to bring the exports for the first seven months of this year (\$51,914,017) up to the level reached in that period of last year (\$55,342,022).

Tractor exports showed the largest increase in July, amounting to \$4,006,743, against \$2,660,296 in 1926. The gain in wheel tractors amounted to more than \$1,000,000, reaching a total of \$3,073,723.

Production of Abrasives in 1926

The total quantity of natural abrasives sold by producers in the United States in 1926 was about 225,000 net tons, valued at over \$4,500,000, according to a statement compiled by the United States Bureau of Mines. In addition, there were manufactured and sold during the year 73,603 net tons of artificial abrasives, valued at \$6,751,165.

Machinery Exports at High Level

August Largest Month in Six Years—Imports Continue Heavy, with Eight-Month Total Ahead of 1926

WASHINGTON, Sept. 24.—Exports of machinery of all kinds in August increased to \$41,018,828 from \$40,222,514 in July and \$32,430,905 in August of last year. For the eight months ended with August, however, the value was \$270,308,253, a decline of almost \$23,000,000 from the corresponding period of last year, when the total was \$293,086,253.

Exports of industrial machinery as classified by the Division of Statistics, Department of Commerce, were valued at \$17,493,192 in August, against \$18,773,102 in July. As classified by the Industrial Machinery Division the value was \$16,070,000, compared with \$17,073,000 in July. For the eight months ended with August of the current year exports of industrial machinery, according to the classification of the Division of Statistics, was \$136,387,536, against \$118,266,835 for the corresponding period of 1926. The value for the eight months of the present year, under the Industrial Machinery classification, was \$136,537,000, or \$21,160,000 in advance of the 1926 period.

Exports of all power-driven metal-working machinery in August were valued at \$1,683,994, against \$1,318,401 in July and \$1,326,803 in August of last year. For the eight months ended with August the value was \$12,193,040, compared with \$9,624,523 for the corresponding period of last year. Included are machine tools which, in August, totaled 586, valued at \$912,321, as listed in THE IRON AGE table, compared with 531, valued at \$870,821, in July.

Total imports of machinery and vehicles in August were valued at \$1,895,336, against \$1,677,812 in July. For the eight months ended with August, 1927, the value was \$18,904,671, as against \$17,887,083 for the corresponding period of last year. Imports of machinery listed in THE IRON AGE table were valued in August at \$1,251,074, compared with \$1,139,946 in July. For the eight-month periods of 1927 and 1926, respectively, the values were \$12,889,910 and \$11,989,097.

Steady Upward Trend

Industrial Machinery Division charts show that the upward trend of exports of industrial machinery is not peculiar to the present year, but has been continuing ever since the collapse of the post-war trade expansion in 1921. It is pointed out that "exports of oil-well machinery have been expanding so consistently for many years that renewed statements to this effect become almost monotonous." Exports for the first eight months of 1927, amounting to \$13,522,235, were the highest in the history of the industry and exceeded the active 1926 period by more than \$4,400,000.

The trend of metal-working machinery exports is especially interesting because of the strenuous competition in this line which has developed abroad. The fact that exports of this class amounted to \$15,409,000 for the eight months of 1927, or \$2,830,000 in excess of the corresponding period of 1926, is pointed to as showing the competitive strength of the American product.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	August		Eight Months Ended August	
	1927	1926	1927	1926
Locomotives	\$147	\$1,298	\$4,304	\$4,334
Other steam engines...	149	127	1,016	667
Bollers	248	96	1,345	1,134
Accessories and parts...	35	26	325	465
Automobile engines...	847	795	8,814	9,859
Other internal combustion engines	618	1,120	4,931	6,251
Accessories and parts...	185	388	2,454	2,008
Electric locomotives...	11	62	313	1,615
Other electric machinery and apparatus	510	582	5,233	4,800
Excavating machinery...	461	208	3,148	3,097
Concrete mixers	92	48	811	521
Road making machinery	131	107	1,535	1,275
Elevators and elevator machinery	383	352	3,337	3,367
Mining and quarrying machinery	1,106	1,085	9,175	10,434
Oil well machinery.....	1,599	1,083	13,522	9,105
Pumps	505	418	4,455	4,032
Bending and power presses	169	212	868	804
Machine tools (a)	912	565	7,395	4,835
Forging machinery	130	129	676	813
Other metal-working machinery and parts....	540	299	2,216	2,952
Textile machinery	1,022	531	7,279	7,206
Sewing machines	798	610	6,254	5,653
Shoe machinery	167	122	1,129	922
Flour-mill and gristmill machinery	55	41	373	582
Sugar-mill machinery ..	448	504	2,252	2,157
Paper and pulp mill machinery	262	310	2,684	1,964
Sawmill machinery	61	46	542	674
Other woodworking machinery	109	85	954	807
Refrigerating and ice-making machinery ..	590	349	4,977	3,142
Air compressors	558	392	4,122	3,285
Typewriters	1,522	954	13,947	12,400
Power laundry machinery	163	99	1,141	961
Typesetting machines ..	430	330	2,895	2,483
Printing presses	821	314	4,272	3,867
Agricultural machinery and implements	11,850	8,795	63,766	64,247
All other machinery and parts	13,382	9,945	99,625	88,090
Total	\$41,019	\$32,431	\$270,308	\$270,308

(a) Shown in detail in another table.

Imports of Machinery into the United States

(By Value)

	August		Eight Months Ended August	
	1927	1926	1927	1926
Metal - working machine tools and parts....	\$23,738	\$23,302	\$281,279	\$321,216
Agricultural machinery and implements ..	268,958	264,345	4,071,941	3,849,119
Electrical machinery and apparatus	186,346	61,623	1,219,646	598,625
Other power-generating machinery	90,847	5,473	137,133	63,630
Other machinery	546,356	743,409	5,663,057	5,773,468
Vehicles, except agricultural ..	134,829	178,949	1,516,854	1,383,039
Total	\$1,251,074	\$1,277,101	\$12,889,910	\$11,989,097

Exports of Power-Driven Metal-Working Machinery

	August, 1927		July, 1927	
	No.	Value	No.	Value
Engine lathes	32	\$100,395	48	\$94,168
Turret lathes	19	52,819	16	31,718
Other lathes	49	112,404	39	57,721
Vertical boring mills and chucking machines	6	12,777	16	37,598
Thread-cutting and automatic screw machines	78	76,302	47	36,565
Knee and column-type milling machines....	9	15,301	9	14,453
Other milling machines	23	48,924	38	74,979
Gear-cutting machines	29	95,168	34	85,248
Vertical drilling machines	28	24,916	17	24,287
Radial drilling machines	7	25,151	9	22,230
Sensitive drilling machines	32	7,165	15	698
Other drilling machines	79	34,154	71	30,759
Shapers and slotters..	40	58,741	28	44,953
Planers	2	1,840	4	6,142
External cylindrical grinding machines...	48	128,283	44	150,271
Internal grinding machines	36	86,271	62	133,238
Metal-working tool-sharpening machines	69	31,710	34	25,793
Total	586	\$912,321	531	\$870,821

British and Continental Trade Dull

International Cartel Meets — German Steel Output Reaches Record — New Process Tube Mill in Germany to Produce 90,000 Tons a Year

(By cable)

LONDON, ENGLAND, Sept. 26.

DEMAND for Cleveland pig iron still improves with consumers showing more interest in forward buying. Export sales are also increasing and makers are contemplating blowing in additional furnaces, as demand is exceeding output. Stocks, however, are still large, although rapidly decreasing.

Italian consumers of British hematite have purchased heavily and domestic demand for hematite is increasing, but stocks are large. Foreign ore continues quiet.

There is an improved tone to the ferromanganese market, as a result of reports that there will be negotiations among makers for a mutual working arrangement. No definite information, however, is available.

Finished steel is very quiet, domestic consumers not being attracted by rebates and export demand continuing small. Plate and shape mills especially need

tonnage. New shipbuilding orders are coming in but no steel for these contracts has yet been placed.

Welsh tin plate is quiet and prices weak at 18s. (\$4.37) per base box, f.o.b. works port. More mills have closed including Baldwins, Ltd., King's Dock works, and the Cwmfelin works, Swansea, of Richard Thomas & Co. Output is now under 65 per cent of capacity. Galvanized and black sheets are quiet.

Continental iron and steel are very quiet. British consumers of semi-finished are disinterested as the sheet and tin plate markets are inactive. Export demand is small. Various Continental meetings are now being held, which may influence the position of the International Steel Cartel meeting Monday and subsequent days of this week. The European Rail Makers' Association assembled in Luxemburg this week.

The German steel ingot output in August creates a post-war record at 1,420,000 tons. The Belgian output in August was 317,000 tons of pig iron and 317,000 tons of steel ingots.

BELGIAN MARKET DECLINING

Competition From France, Germany and Luxemburg Severe—Sales to Britain Smaller

ANTWERP, BELGIUM, Sept. 10.—Following a slight improvement in demand that was in evidence about a fortnight ago, the market is again quiet and prices are showing a further tendency to weakness. It is difficult to determine actual prices, as mill quotations depend upon the state of each producer's order books. An added factor in the weakness of prices is the return of German mills to competition for export business, their aggressiveness in seeking foreign tonnage increasing as their own domestic market grows quieter. French and Luxemburg mills are also appearing as competitors, so that whatever favorable appearance the market had last month is rapidly disappearing.

Pig Iron.—Export demand, especially from England,

has declined and British furnaces are contemplating further reductions in the price of foundry iron. There is a small volume of domestic business but consumers seek lower prices than producers wish to accept. For export, No. 3 phosphoric foundry iron is quoted at £2 18s. to £3 (\$14.09 to \$14.58) per ton, f.o.b. Antwerp. The coke market continues unchanged with furnace coke at 185 fr. (\$7.25) per ton and foundry grade at about 200 fr. (\$7.84) per ton.

Semi-Finished Material.—The tendency of prices is downward with German competition for tonnage increasing in a comparatively quiet market. Blooms are quoted at about £3 19s. (\$19.20) per ton for 6-in. and larger and about £4 3s. (\$20.17) per ton for 4 in. Billets are about £4 6s. 6d. (\$21.02) per ton for 2 in. and about £4 5s. (\$20.65) per ton for 3 in., all f.o.b. Antwerp.

Finished Material.—The market is beginning to develop a definite downward trend under pressure of buyers. Mills are still endeavoring to avoid granting the concessions demanded by consumers but many are not

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'g.	£0 18s.			\$4.37	
Bilbao Rubio ore, f.	1 1	to £1 1½s.		5.10	to \$5.16
Cleveland No. 1 fdy.	3 10			17.01*	
Cleveland No. 3 fdy.	3 7½			16.40*	
Cleveland No. 4 fdy.	3 6½			16.16*	
Cleveland No. 4 forge	3 6			16.04*	
Cleveland basic (nom.)	3 15	to 3 15½		18.23	to 18.35
East Coast mixed	3 15			18.23	
East Coast hematite	3 15½			18.35	
Rails, 60 lb. and up.	7 15	to 8 0		37.67	to 38.88
Billets	6 0	to 6 10		29.16	to 31.59
Ferromanganese	12 0	to 12 10		58.32	to 60.75
Ferromanganese (export)	11 0	to 11 5		53.46	to 54.68
Sheet and tin plate bars, Welsh	5 11½	to 5 15		27.09	to 27.95
Tin plate, base box	0 18	to 0 18½		4.37	to 4.43
Black sheets, Japanese specifications	13 15	to 14 0		66.83	to 68.04
Ship plates	7 12½	to 8 2½		1.65	to 1.76
Boiler plates	10 10	to 11 0		2.28	to 2.39
Tees	8 2½	to 8 12½		1.76	to 1.87
Channels	7 7½	to 7 17½		1.60	to 1.70
Beams	7 12½	to 8 2½		1.55	to 1.65
Round bars, ¾ to 3 in.	10 10	to 11 0		2.28	to 2.39
Steel hoops, 24 gage	10 10	to 10 5		2.17	to 2.22
Galv. sheets, 24 gage	13 15	to 14 0		2.98	to 3.03
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5		3.03	to 3.09

*Export price, 2½s. less for 500 tons or more.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)				
Foundry pig iron: (a)				
Belgium	£3 0s.	to £3 0½s.	\$14.58	to \$14.70
France	3 0	to 3 0½	14.58	to 14.70
Luxemburg	3 0	to 3 0½	14.58	to 14.70
Basic pig iron:				
Belgium	2 18	to 2 19	14.09	to 14.34
France	2 18	to 2 19	14.09	to 14.34
Luxemburg	2 18	to 2 19	14.09	to 14.34
Coke	0 18		4.37	
Billets:				
Belgium	4 5	to 4 6	20.66	to 20.90
France	4 5	to 4 6	20.66	to 20.90
Merchant bars:				
Belgium	4 13	to 4 14	1.03	to 1.04
France	4 13	to 4 14	1.03	to 1.04
Luxemburg	4 13	to 4 14	1.03	to 1.04
Joists (beams):				
Belgium	4 12	to 4 13	1.02	to 1.03
France	4 12	to 4 13	1.02	to 1.03
Luxemburg	4 12	to 4 13	1.02	to 1.03
Angles:				
Belgium	4 13	to 4 14	1.03	to 1.04
½-in. plates:				
Belgium (a)	6 5	to 6 6	1.38	to 1.39
Germany (a)	6 5	to 6 6	1.38	to 1.39
¾-in. ship plates:				
Belgium	6 1	to 6 2	1.33	to 1.34
Luxemburg	6 1	to 6 2	1.33	to 1.34
Sheets, heavy:				
Belgium	6 1		1.33	
Germany	6 1		1.33	

(a) Nominal.

sufficiently well booked to withstand the pressure. A further cause of lower prices is the increased competition from German and French mills. The former prices of £4 15s. to £4 16s. per ton (1.04c. to 1.05c. per lb.) f.o.b. Antwerp for bars have disappeared and £4 14s. per ton (1.03c. per lb.) is done only on small tonnages. On desirable specifications £4 13s. per ton (1.02c. per lb.) could probably be done, but in the present quiet market no actual test has been provided. The market on beams also shows weakness with French makers quoting as low as £4 10s. to £4 11s. 6d. per ton (0.99c. to 1.00c. per lb.). Demand for hoops is poor and the market on rods is also weak. Corrugated bars are quiet with prices ranging from £5 2s. to £5 3s. per ton (1.13c. to 1.14c. per lb.). The sheet market is fair and prices are being fairly well maintained.

German Prediction of Price War Stirs Controversy

HAMBURG, GERMANY, Sept. 10.—A series of articles on the German steel business which have been appearing in the *Rheinische Westfälische Wirtschaftsdienst* have aroused considerable controversy. The articles have attracted wide attention because of their appearance in such a well-known and usually well-informed publication. They predict the approaching end of the present domestic activity in the steel industry and particularly dwell upon the severe competition which will follow this decline in the volume of business booked by the steel works.

It is further predicted that there will be a price war between German producers and the other western European mills beginning early in the coming winter, and that it will be more serious than any in the past. It is pointed out that, while German industry has to its advantage highly standardized and efficient means of production, it is handicapped by higher wages, higher taxes and greater freight rates on export shipments than its western neighbors. Many leaders of the steel industry and other industrial publications thoroughly disagree with these pessimistic predictions.

New German Tube Mill to Produce 90,000 Tons a Year

HAMBURG, GERMANY, Sept. 10.—The recently formed steel corporation, the *Niederrheinische Stahlwerke A. G.* at Düsseldorf, has completed its program of production and expects to have an output of about 90,000 tons of tubes and pipes annually. Operations are expected to begin within the next six months on the new patented tube machinery of the *Maschinenfabrik Sack*, which is said to permit the production of high-quality pipe at lower costs than by any other method employed in European tube mills. It is intended to offer the greater part of the output for export.

Should this new producer refuse to join the tube cartel, which is considered unlikely, the existence of the cartel would be threatened. In some quarters it is reported that eventually this new corporation will merge with the United Steel Works. The works owns patents on all tubular production by the new process.

Shortage of Skilled Labor in German Industry

HAMBURG, GERMANY, Sept. 10.—The steel industry is experiencing considerable difficulty in securing sufficient skilled workmen. Although there are still more than 400,000 unemployed in Germany, there is a scarcity of trained workers, and some of the recently contemplated production increases have been difficult or almost impossible as a result of this situation. It is expected that this scarcity of skilled labor will be intensified during the next few years as a result of the large decline in the birth rate during the war years. At present the number of apprentices in the steel industry is about 40 per cent less than formerly.

DUMPING DECISION AWAITED

Importers of German Steel Marking Time — Sales of Foreign Material Small

NEW YORK, Sept. 27.—Importers of Continental steel are booking but little business, although the prices quoted by European mills seem to be showing some tendency to weakness. With the prices offered by mills in this country, the saving by importing is not regarded sufficiently large to interest American consumers. Importers representing German mills are confining their business to small lots of material while awaiting decision by the Treasury Department on the question of alleged German dumping.

Importers who will be directly affected by an adverse decision rendered by the Treasury Department hope that a protest will be made to the State Department through the German ambassador, but no such action has been taken so far as is known. In some quarters it is pointed out that, should Germany protest discrimination on the basis of the treaty, which contains a "most favored nation" clause, there would be a difficult situation as Germany has an agreement with Italy under which there is an exchange of German chemicals for high-priced Italian motor cars at special low duties.

Unless some action is taken by the German Government, importers believe that the decision of the Treasury Department will be made purely on technical grounds and will be adverse.

Export to Japan Still Small

The tin plate for the Nippon Oil Co., reported placed in the United States, did not go to two Japanese export houses, as was originally reported, but the entire 61,500 base boxes was placed with one large Japanese exporter. There are some small inquiries in the market from Japan for tin plate but at present there is no interest in black sheets. The recent inquiry of the Nara Electric Railway for 27 miles of 75-lb. rails is believed by exporters to have been awarded to the Imperial Steel Works. Bids opened yesterday on 23 miles of 75-lb. rails for the Kobe-Arima Electric Railway Co.

Chinese trade continues quiet. There are occasional inquiries from Shanghai for tin plate but very little purchasing. Chinese merchants are seldom willing to offer more than \$34 to \$35 per ton, c.i.f. Shanghai, for wire shorts and this is too low to interest American mills. On second hand material the usual offers from China are \$26 to \$28 per ton, c.i.f. Chinese port.

A large export order for steel tanks, involving 9000 tons of steel, has been taken by the Chicago Bridge & Iron Works, Chicago. The order includes fabrication and erection of more than 50 tanks and all of the miscellaneous plate work in connection with the building of a new refinery by the Anglo-Mexican Petroleum Co. on the island of Aruba, Dutch West Indies.

United Steel Works Establishes London Office

HAMBURG, GERMANY, Sept. 10.—A branch sales office has been established in London by the *Vereinigte Stahlwerke* (United Steel Works). This branch will aid in the development of overseas business through cooperation with British exporters. It will also carry a large stock of imported iron and steel. A similar branch office has been in existence in New York for some time, but without a stock of material.

Swedish Export Prices Lower — Record Ore Shipments

STOCKHOLM, SWEDEN, Sept. 11.—Export quotations on iron and steel have been considerably reduced for the first time since last January. Pig iron is being offered at about \$28.90 per gross ton for an analysis of 0.015 per cent sulphur and 0.025 per cent phosphorus. Billets of 0.45 per cent carbon are quoted at \$70.89 per gross ton and wire rods of 0.45 per cent carbon and higher at \$87.50. Soft Martin iron is offered at about

\$51 per gross ton and Lancashire iron bars at \$81 per ton.

Iron ore exports established a new high record in August. The total shipped by the Grangesberg Co. was 1,151,000 tons compared with 1,110,000 tons in July and a further 100,000 tons was shipped by independent mines, compared with about 86,000 tons shipped by them in July.

Germany Replacing Old Blast Furnaces

HAMBURG, GERMANY, Sept. 10.—According to a recent estimate, blast furnace operations in Germany will have been completely reorganized by about 1930. There are still about 44 blast furnaces in Germany which are of small capacity and more or less obsolete. It is expected that these will be dismantled during the next two years and replaced by new furnaces. About two years ago there were 67 old type blast furnaces in operation. This replacement is expected to bring the monthly output per furnace almost to the level of the United States. Compared with the former average output of 8700 tons per month, production is now about 10,000 tons a month for each furnace and by the end of this year it is expected to reach 12,000 tons per furnace. Within the next two years it is estimated that the output per furnace will have been increased by the new construction to about 16,000 or 17,000 tons a month.

Abolition of Customs Duty Exemptions Proposed in Brazil

A projected law is before the Brazilian Congress for abolishing all exemptions from customs duties and other charges which are covered by general or special legislation, with certain exceptions, according to advices from Vice-Consul Rudolf Cahn, Rio de Janeiro, made public by the Department of Commerce. The proposed law endeavors to minimize as much as possible all future exemptions. The exceptions are made in the case of exemptions covered by special contracts signed with the Federal Government, and those specified in the preliminary provisions of the customs tariff.

Will Take Bids for Steel for Two Cruisers

WASHINGTON, Sept. 24.—Bids will be opened on Oct. 4 by the Bureau of Supplies and Accounts, Navy Department, for approximately 10,840 net tons of plates, shapes and rivet rods for light cruisers 28 and 29, one each to be built at the Mare Island and Puget Sound navy yards. Quotations are to be on a delivered basis. The plates will include about 3985 tons of black medium, 616 tons of galvanized and 3500 tons of special treatment plates. The shapes will include about 2865 tons of black and 555 tons of galvanized; the channels, about 50 tons high tensile material; rivet rods, 250 tons, and nickel and bullet proof steel approximately 185 tons.

Shipping Board Buys Diesel Engines

WASHINGTON, Sept. 27.—The award of contracts for the construction of eight Diesel engines for installation in Shipping Board cargo vessels has been announced as follows:

(1) With the Busch-Sulzer Brothers Diesel Engine Co., St. Louis, for two 3950 brake hp. two-cycle, single-acting, internal combustion engines, with two Elliot scavenging blowers, \$584,600.

(2) With the Hooven, Owens, Rentschler Co., Hamilton, Ohio, for two 4000 brake hp., two-cycle, double-acting, internal combustion engines, with two scavenging blowers, \$592,000.

(3) With McIntosh & Seymour Corporation, Auburn, N. Y., for two 3900 brake hp., four-cycle, double-acting, internal combustion engines, with "longest piston and most piston rings," \$577,200.

(4) With the Worthington Pump & Machinery Corporation, New York, for two 3625 brake hp., two-cycle, double-acting, internal combustion engines, with two Elliot scavenging blowers, \$536,500.

POLITICAL STIR OVER MORROW

Business Ability, However, Well Qualifies Him for Mexican Post

WASHINGTON, Sept. 27.—Recess appointment of Dwight Whitney Morrow of J. P. Morgan & Co., New York, to be ambassador to Mexico, has created the expected political stir because Mr. Morrow was a member of the firm which heads the banking syndicate holding the Mexican loan. Nevertheless the selection of such an able business man has been greeted with keen sympathy, not only in the East with its alleged "Wall Street" influences, but throughout the country. That Mr. Morrow will be confirmed by the Senate seems to be a foregone conclusion. Efforts of administration opponents to make political capital out of the appointment of Mr. Morrow may well be expected and likely will delay his confirmation somewhat after Congress convenes, but the high character of Mr. Morrow and the unanimously conceded fact of his ability, together with the promise of his being an important factor in stabilizing conditions in Mexico, are factors that are too overwhelming for political strictures.

Whether or not Mr. Morrow may actually be able to eliminate perennial controversies between the United States and Mexico, thus giving assurance to trade relations of great benefit not only to this country but the world at large, remains to be seen. It is an end to be hoped for, but to predict its being achieved through the work of even such a capable man as Mr. Morrow would be dangerous in view of past history of the Mexican Government. While financial relations, loans, etc., might be an element in any situation, they have not proved invulnerable against political disturbances and revolutionary demonstrations, and the Calles Government, even aside from more or less strained relations with the United States, has its own internal problems of unrest, which might develop into serious outbreaks at any time.

Mr. Morrow, an alumnus of Amherst College, as is President Coolidge, has given up all relations with the firm of J. P. Morgan & Co. and other business connections.

President Coolidge has made it clear that the administration policy toward Mexico has not been, and will not be, changed. That policy has been an unalterable opposition to confiscation of American property, whether by legislation or otherwise. So far as American capital invested in Mexico is concerned Mr. Morrow will have an important charge to protect, to say nothing of his responsibilities in other ways. It was estimated in December of last year that American capital invested in Mexico ranged between \$1,250,000,000 and \$1,500,000,000. This was divided in principal groups approximately as follows: Oil lands and oil refineries, \$375,000,000; mines and smelters, \$350,000,000; railroads, \$200,000,000; real estate, urban and rural, \$200,000,000; public utilities, \$30,000,000; manufacturing, \$25,000,000; merchandising operations, \$25,000,000.

Wellman-Seaver-Morgan Co. Forms Canadian Company

The Wellman-Seaver-Morgan Co., Cleveland, announces the incorporation of an associated company in Canada known as the Canadian Wellman-Seaver-Morgan Co., Ltd., under the Dominion Companies Act. The head office is at 307 Reford Building, Toronto, Ont., and a branch office is at 808 Drummond Building, Montreal, Que., for the handling of the company's products, which include coal and ore-handling machinery, mining machinery, special cranes, port and terminal equipment, steel works equipment, coke oven machinery, gas producers and other specialties.

Apparent consumption of babbitt metal in August was 2748 net tons, as reported by the Department of Commerce. This is the largest figure since March. It compares with 2302 tons in July. In August of last year the total was 2872 tons and in August, 1925, it was 2963 tons.

Machinery Markets and News of the Works

EXPOSITION A SUCCESS

Machine Tool Buyers in Thousands Attend Cleveland Show

Some Business and Many Prospects Develop from Gathering of Makers and Users of Equipment

THE National Machine Tool Exposition in Cleveland last week outshadowed all other developments in the machine tool trade. More than 11,000 visitors, exclusive of machine tool interests, and practically all, as shown by registration information, holding responsible positions with machine tool buying companies, attended the exhibition of new and improved products of about 150 machine tool companies. While some business was transacted at the show, the principal success was in the

development of many prospects, from which sales are expected to accrue in the next few months.

Machinery sales rooms and offices throughout the country were practically deserted during the week, so whatever business may have come to light in local territories will go over until this week for final closing. An outstanding order was 11 lathes sold to an Eastern company by a Cincinnati builder. The Ford Motor Co., Detroit, bought seven special milling machines.

Aside from the specific orders which may result from "leads" gathered at the Cleveland exposition, the outlook for the machine tool trade for the remainder of the year is, as usual, dependent on the extent to which general industrial activity recovers during the fall. September has been disappointing, though somewhat better than August in the volume of machinery sales, and hopes are entertained that October will show further increasing number of inquiries received by the trade. Their gains, an expectation that is based partly on the during the past two or three weeks.

New York

NEW YORK, Sept. 27.

ACTIVITY in machine tools has perhaps been temporarily interrupted this week by the National Machine Tool Exposition in Cleveland. A satisfactory volume of business is reported to have been transacted there. It was recently reported that the New York Central Railroad had suspended all purchases of machinery except absolute necessities until next year's appropriation. In the past week, however, inquiries from this railroad have included one turret and two engine lathes.

Among purchasers of tools during the past week were: A Connecticut clock manufacturer, a 14-in. rebuilt vertical surface grinder; a New York builder of tractors, a jig boring machine; an oil well supply company, a 1500-lb. single frame steam hammer; an engineering and construction company in Philadelphia, an 18-in. x 10-ft. geared head lathe; a contractor in Chicago, a Racine No. 3 saw, a 20-in. Aurora drill and a Ransom grinder; a press manufacturer in Toledo, a No. 7 Newark gear cutting machine; a western Pennsylvania company, a used No. 3 Cincinnati vertical milling machine; a sheet metal working company in Pittsburgh, a 22-in. Aurora drill; the Pittsburgh & Shawmut Railroad, a used Le Blond 21-in. x 12-ft. lathe.

The McCabe & Sheeran Machinery Corporation, 50 Church Street, New York, is conducting the sale of the entire equipment of the Blake & Knowles Works of the Worthington Pump & Machinery Corporation at East Cambridge, Mass. The Worthington company has transferred operations to other plants and all machinery, buildings and land at East Cambridge are on the market. The machinery equipment includes lathes, planers, upright and horizontal boring machines, radial drills, upright drills, multiple-spindle drills, slotters, grinders and also the full contents of the pattern shop and foundry. A large assortment of motors, a.c. and d.c., is also being offered for sale.

Officials of the Long Island Auto Radiator Co., 362 Harris Avenue, and the Keystone Auto Radiator Co., 22 Third Street, Long Island City, have organized the Long Island-Keystone Auto Radiator Corporation to take over and consolidate the two companies. An expansion program will be arranged.

The Crescent Mfg. Co., 730-38 Whitlock Avenue, New York, manufacturer of furniture, is said to be planning the

early rebuilding of the portion of its plant destroyed by fire Sept. 18, with loss reported at \$50,000 including equipment.

The Nevada Consolidated Copper Co., 25 Broad Street, New York, has work in progress on a new plant at its Ruth copper mine, Ely, Nev., for underground mining, with ore-handling facilities, conveying and hoisting equipment, etc., to cost close to \$1,000,000 including machinery.

The Board of Education, Nyack, N. Y., is considering the installation of manual training equipment in its proposed junior and senior high school to cost about \$500,000, for which bids will be asked on a general contract about the middle of October. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

E. L. Phillips & Co., 850 Sixty-fifth Street, Brooklyn, engineers, are making improvements in their artificial gas plants at Bay Shore and Far Rockaway, L. I., including the installation of new equipment. A de-emulsifier unit will be installed at each plant, of Semet-Solvay type, for the treatment of tar emulsions, and considerable other machinery will be installed.

The Navy Supply Office, South and Whitehall Streets, New York, has been authorized to purchase 500 steel boiler tubes under open market requisition NSA 383.

The Hudson Oil Co., 109 Broad Street, New York, has plans for a new one-story plant at Newark, N. J., for oil blending service, to cost close to \$30,000 with machinery. E. A. Self, 247 Park Avenue, is architect.

J. H. & C. S. Odell & Co., 407 West Forty-second Street, New York, manufacturers of pipe organs, have completed plans for a new two-story plant at Mount Vernon, N. Y., to cost close to \$50,000 with equipment. The Austin Co. is architect and engineer.

Peter M. Occo, 433 Steinway Avenue, Long Island City, architect, has plans for a one-story automobile service, repair and garage building, 155 x 200 ft., at Woodside, L. I., to cost \$100,000 with equipment.

The Remington Arms Corporation, 25 Broadway, New York, with plants at Ilion, N. Y., and Bridgeport, Conn., has recently acquired the Universal Machine Co., manufacturer of self-service vending machines and parts, and will consolidate with the cash register division of its organization. Production of the Universal equipment will be continued.

Franklin, Bates & Heindsman, 2526 Webster Avenue, New York, architects, have filed plans for a two-story automobile service, repair and garage building, 100 x 100 ft., to cost close to \$100,000 with equipment.

The Western Electric Co., 195 Broadway, New York, has awarded a general contract to Henry Steers, Inc., Tube Concourse Building, Jersey City, N. J., for a one-story addition

to its telephone equipment and cable plant at Kearny, N. J., to cost close to \$200,000 with machinery.

The Jersey Central Power & Light Co., Morristown, N. J., has arranged for a bond issue of \$2,300,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. The company has work in progress on a new steam-operated electric generating plant at Whippany, N. J., to cost in excess of \$1,000,000.

Abraham Davis, 140 Montgomery Street, Jersey City, N. J., architect, has plans under way for a two-story automobile service, repair and garage building, 200 x 290 ft., to cost \$150,000.

The Art Metal Works, Mulberry and Center Streets, Newark, has acquired vacant property on adjoining site and plans the early erection of an addition, to cost in excess of \$50,000 with equipment. Louis V. Aronson is president.

The Fawcett School of Industrial Arts, 55 Academy Street, Newark, has preliminary plans for a new three-story industrial school, 120 x 120 ft., to cost in excess of \$400,000 with equipment. Guilbert & Betelle, Chamber of Commerce Building, are architects.

The Texas Co., 17 Battery Place, New York, is said to have plans for a new five-story oil storage and distributing plant at Newark, to cost upward of \$85,000 with equipment.

Philadelphia

PHILADELPHIA, Sept. 26.

THE Rittenhouse Motor Car Co., Greene Street and Cheltenham Avenue, Philadelphia, local representative for the Packard automobile, has leased a new multi-story building to be erected at Cheltenham and Ogontz Avenues, 100 x 206 ft., to cost more than \$200,000, for expansion in service and repair divisions.

J. Ethan Fieldstein, Otis Building, Philadelphia, architect, has asked bids on a general contract for a one-story automobile service, repair and garage building, 105 x 215 ft., to cost approximately \$100,000 with equipment.

I. Silberman, care of Berman Brothers, 6019 Market Street, Philadelphia, has purchased property at 208-10 South Fifty-ninth Street, and will remodel for a machine repair and automobile service works.

The Boyertown Burial Casket Co., Boyertown, Pa., manufacturer of bronze burial cases, etc., has acquired property at 342-50 Central Avenue, Newark, N. J., comprising a four-story mill-type structure, totaling 60,000 sq. ft. of floor space, and will remodel for a new factory branch and distributing plant. The company is also operating similar branches at Philadelphia and Harrisburg, Pa.; Brooklyn, N. Y., and Columbus, Ohio.

The Board of Education, Lansdowne, Pa., plans the installation of manual training equipment in a two-story senior and junior high school to cost \$450,000, for which bids have been asked on a general contract on revised plans. Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, are architects.

Solomon Kaplan, 10 South Eighteenth Street, Philadelphia, architect, is preparing plans for a one-story automobile service, repair and garage building with capacity of 200 cars, to cost more than \$115,000 including equipment.

The David Lupton's Sons Co., Allegheny Avenue and Tulip Street, Philadelphia, manufacturer of steel sash, etc., has arranged for a bond issue of \$2,000,000, a portion of the fund to be used for expansion and additions to working capital.

McArdle & Cooney, Inc., 519 Arch Street, Philadelphia, steam fitting equipment and supplies, has awarded a general contract to the Farrell-Roth Construction Co., 21 South Forty-sixth Street, for a one-story addition and improvements in present works. Folsom, Stanton & Graham, 10 South Eighteenth Street, are architects.

The Board of Education, Mays Landing, N. J., plans the installation of manual training equipment in a new high school to cost more than \$300,000, for which bids are being asked on a general contract until Oct. 7. S. Hudson Vaughan, Guarantee Trust Building, Atlantic City, N. J., is architect.

The Atlantic City Electric Co., Atlantic City, N. J., is disposing of a bond issue of \$2,762,000, a portion of the proceeds to be used for extensions and improvements in plants and systems, including the acquisition of the Electric Co. of New Jersey, and the Atlantic County Electric Co.

J. B. Shoemaker's Sons, Front and East Clearfield Streets, Philadelphia, manufacturer of metal-reinforced and other wood boxes and cases, has taken out a permit for a two-story addition, to cost close to \$40,000 including equipment.

The Holland Furnace Co., Bethlehem, Pa., manufacturer of house-heating furnaces and other domestic heating equip-

ment, with main plant at Holland, Mich., has plans in progress for a new unit at its Bethlehem works, to cost more than \$75,000 with equipment. It is purposed to break ground during the fall.

The Pennsylvania Power & Light Co., Allentown, Pa., will build a new steel tower transmission line from the northern Lebanon Valley section to Norristown, Pa. The work will be carried out under the direction of the Phoenix Utility Co., 2 Rector Street, New York, an affiliated organization.

The Pure Oil Co., Marcus Hook, Pa., plans to rebuild the portion of its local oil refinery, concentrated largely at the No. 1 still unit, including building and equipment, destroyed by fire Sept. 17, with loss reported in excess of \$30,000.

Buffalo

BUFFALO, Sept. 26.

THE White Motor Co., Seventy-ninth Street and St. Clair Avenue, Cleveland, manufacturer of motor trucks, has awarded a general contract to the G. A. Rutherford Co., 2725 Prospect Avenue, Cleveland, for a one- and two-story factory and distributing branch at Syracuse, N. Y., to cost upward of \$150,000. The W. S. Ferguson Co., Euclid Avenue, Cleveland, is engineer.

The Curtiss Aeroplane & Motor Co., 74 Kail Street, Buffalo, has filed plans for a one-story addition, to cost close to \$17,000 with equipment.

The Trico Products Corporation, Buffalo, manufacturer of windshield cleaning devices and other automobile accessories, is disposing of a stock issue to aggregate \$5,425,000, a portion of the fund to be used for expansion. The company operates a subsidiary, known as Folberth, Inc., with plant at 7920 Lake Street, Cleveland. J. R. Oishei is president.

The Sanford Motor Truck Co., 107 St. Marks Avenue, Syracuse, N. Y., is said to be planning a one-story addition to cost more than \$45,000 with equipment.

The Washburn-Crosby Co., Chamber of Commerce Building, Buffalo, with headquarters at Minneapolis, Minn., is said to have preliminary plans under way for an addition to its flour mill at Michigan Avenue and West Ganson Street, to cost more than \$200,000 with equipment. Frank F. Henry is local manager.

The Empire Power Corporation, Elmira, N. Y., has plans for extensions and improvements in its local steam-operated electric generating station, including the installation of a 6000-kw. generating unit and auxiliary equipment. The company has work under way on transmission lines from Elmira to Binghamton, and from Elmira and Geneva, N. Y., to operate at 110,000 volts, and will build a group of automatic power substations in this connection.

The Henter Corporation, Silver Creek, N. Y., a new industry, has leased a portion of a local building and will engage in the manufacture of die cast specialties.

New England

BOSTON, Sept. 26.

BUSINESS in new equipment the past week was virtually at a standstill, and the number of used machines sold was negligible. Certain dealers state inquiries are more numerous, although all are for single machines. A majority of the trade, however, sees no improvement in prospective business.

The past few days witnessed a spurt in small tool buying. The demand for gages is quiet compared with that for taps, dies, etc.

The following firms have exhibits at the New England Fair at Worcester, Mass., which opened Sept. 27 and will close at midnight, Oct. 1: American Steel & Wire Co., Arcade Malleable Iron Co., Arter Grinding Machine Co., Baldwin Chain & Mfg. Co., John Bath, Inc., Boston Pressed Metal Co., Coppel Engineering Co., Fremont Casting Co., Graton & Knight Mfg. Co., Heald Machine Co., Leland-Gifford Co., Lowell Wrench Co., Morgan Construction Co., New England Coal & Coke Co., Parker Wire Goods Co., Reed-Prentice Corporation, Reed & Prince Mfg. Co., Reed Small Tool Works, Standard Foundry Co., Stevens-Walden-Worcester, Inc., Stockbridge Machine Co., Worcester Pressed Aluminum Co., Worcester Pressed Steel Co., George F. Wright Steel & Wire Co., and Wyman-Gordon Co.

The Norton Co., Worcester, Mass., will erect an 80 x 130 ft. manufacturing plant and furnace to cost \$30,000.

The board of contract and supply, Providence, R. I., has awarded a contract for a one-story and basement, 50 x 70 ft.

The Crane Market

CURRENT inquiries for electric overhead cranes are generally confined to single units. The locomotive crane field is quiet with a moderate volume of inquiry reported but very little purchasing. The Norfolk & Western Railroad is reported about to close on its list of overhead cranes, awarding the business to two builders, one in the East and one in the West. The overhead crane for the Hornell, N. Y., shops of the Erie Railroad has not yet been purchased.

Among recent purchases are:

Stone & Webster, Inc., Boston, a 60-ton electric overhead crane for the United Electric Co., Springfield, Mass., from the Cleveland Crane & Engineering Co.

Youngstown Sheet & Tube Co., Youngstown, a 5-ton, 37-ft. span, hand controlled crane for the blacksmith shop from the Shaw Electric Crane Co.

Wausau Paper Mills Co., Brokaw, Wis., a 20-ton, 25-ft. span hand power crane from H. D. Conkey & Co.

American Fabricated Steel Co., Philadelphia, a 10-ton, 37-ft. span, 3-motor cage controlled overhead crane from the Box Crane & Hoist Corporation.

Chateaugay Ore & Iron Co., Scranton, Pa., a 40-ton, 30-ft. span overhead crane from the Box Crane & Hoist Corporation.

Minnesota & Ontario Power Co., Minneapolis, Minn., a 15-ton, 45-ft. span, hand operated overhead crane from the Box Crane & Hoist Corporation.

Warren Mfg. Co., Milford, N. J., a 10-ton, 70-ft. span hand power crane with two 5-ton trolleys from the Box Crane & Hoist Corporation.

McClellan & Junkersfeld, engineers, 68 Trinity Place, New York, a 20-ton, 1-motor overhead crane for the Missouri Power & Light Co., Jefferson City, Mo., from the Northern Engineering Works.

pumping station, for which miscellaneous equipment is required. T. J. H. Pierce, City Hall, is the architect.

The Edison Electric Illuminating Co., 39 Boylston Street, Boston, contemplates the erection of a power station at Arlington, Mass., for which a crane may be required. Bigelow & Wadsworth, 3 Hamilton Place, Boston, are the architects.

The Bay State Tool & Machine Co., 32 Cypress Street, Springfield, Mass., has awarded all subcontracts for its new machine shop. R. M. Mowry, 25 Harrison Avenue, Springfield, is the architect.

The Bassick Co., Bridgeport, Conn., manufacturer of casters, metal furniture trimmings, etc., has plans under way for a two-story addition, 75 x 100 ft., to cost more than \$40,000 with equipment. The company is also having plans drawn for a two-story extension, 60 x 150 ft., at the plant of its M. B. Schenk Division, Meriden, Conn., to cost close to \$50,000 including equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, is architect and engineer for both structures.

The Hart & Hegeman Mfg. Co., Hartford, Conn., manufacturer of electric switches, etc., is disposing of a preferred stock issue of \$1,333,300, a portion of the proceeds to be used for expansion.

Bids are being asked by the Superior Cabinet Works, 93 Newell Avenue, Pawtucket, R. I., for a one-story and basement addition, 175 x 250 ft., to cost close to \$50,000 with equipment. E. G. Bullard & Son, 908 Purchase Street, New Bedford, Mass., are architects.

The Cambridge Rubber Co., 748 Main Street, Cambridge, Mass., has awarded a general contract to the Scully Co., 238 Main Street, for a five-story addition, 80 x 100 ft., to cost upward of \$175,000 with equipment. J. R. Worcester & Co., 79 Milk Street, Boston, are architects and engineers.

Yale Kaplan, Bridgeport, Conn., operating a local plant for automobile accessories, has acquired the two-story factory of the Colonial Brass Works, Plainville, Conn., at a public sale. The new owner will take immediate possession, and will equip for a new branch factory for the manufacture of automobile tire removers and kindred specialties.

The Connecticut Auto Parts Co., Boulevard, East Hartford, Conn., has awarded a general contract to Thomas F. Lloyd, 5 Pleasant Street, East Hartford, for a one-story addition, 60 x 150 ft.

The American Reinforced Paper Co., County Street, Attleboro, Mass., will soon lay foundations for an addition to cost in excess of \$75,000 with machinery. Charles T. Main, 201 Devonshire Street, Boston, is architect and engineer.

The Alexander Milburn Co., Baltimore, manufacturer of welding and cutting apparatus, portable carbide lights, oil burners and paint spraying equipment, has organized the Alexander Milburn Sales Co., with office at 50 Terminal Street, Boston. The office is under the supervision of M. B. Crouse and G. B. Malone, who will handle the sale and distribution of Milburn equipment in the New England states.

The Randall Tool Co., 58 Chalkstone Avenue, Providence, R. I., has been incorporated to buy and sell stocks of small tools, such as taps, dies, etc.

Chicago

CHICAGO, Sept. 26.

INQUIRY for machine tools is in larger volume, but it has not as yet assumed proportions broad enough to definitely indicate a rapid swing away from the dullness of the past two months. Local salesrooms have been deserted by customers and salesmen who have been attending the machine tool exhibition at Cleveland. It is still too early to determine whether or not an upturn in business by Oct. 1 is actually foreseen by the trade. The Nash Motors Co., Racine, Wis., is planning to increase the capacity of its plant in that city. An industrial company has purchased a 36-in. open-side planer and the J. I. Case Threshing Machine Co., Racine, is taking active steps to place orders against its list.

The Foote Brothers Gear & Machine Co., Chicago, has acquired the plant of the A. Plamondon Mfg. Co., Western Avenue and Fifty-third Street, Chicago, a pioneer in the production of cast gears.

The Sioux City Gas & Electric Co., Sioux City, Iowa, will build a plant addition to cost \$760,000. W. J. Bertke is president and general manager.

Melvin E. Nelson, 1720 North California Avenue, Chicago, has prepared plans for a machine shop addition to cost \$20,000. The name of the owner has not been given out.

The American Castings Co., 6833 South Irving Avenue, Chicago, is building a foundry addition, 72 x 125 ft.

The Johnson & Meier Co., 646 North Michigan Avenue, Chicago, manufacturer of wrought iron products, has purchased property, 125 x 150 ft., and will use the site for a new plant.

The Cedar Rapids Engineering Co., Cedar Rapids, Iowa, has awarded a general contract to O. F. Paulson, Granby Building, for a new one-story plant, 30 x 60 ft., to cost close to \$20,000 with equipment.

The Minnesota Northern Power Co., Miles City, Mont., has completed plans for a new two-story steam-operated electric power house, 40 x 105 ft., to cost in excess of \$70,000 with equipment. C. M. Garland, 38 South Dearborn Street, Chicago, is consulting engineer.

The Crown City Iron Works, 1229 Tyler Street, N. E., Minneapolis, Minn., has filed plans for a one-story addition, 41 x 100 ft.

The Russell Grader Mfg. Co., Inc., 2037 University Avenue, S. E., Minneapolis, Minn., manufacturer of road-building machinery, has awarded a general contract to the Lindh-Gustafson-Klopfer Co., Inc., 315 N. E. Fifth Street, for a one-story and basement addition, 165 x 312 ft., to cost \$150,000.

The Russakov Can Co., 936 West Chicago Avenue, Chicago, manufacturer of sheet metal products, will take bids in October for a proposed new one-story plant to cost close to \$50,000 with equipment. B. Shapiro, 6 North Michigan Boulevard, is consulting engineer. J. I. Russakov is vice-president.

The City Council, Mason City, Ill., plans the installation of pumping machinery and power equipment in connection with a proposed municipal waterworks, estimated to cost \$110,000. It is expected to ask bids at an early date.

The Silvers Mfg. Co., 710 Linden Street, Waterloo, Iowa,

manufacturer of bathroom fixtures, etc., has awarded a general contract to the Jens Olesen & Sons Construction Co., 1522 Lafayette Street, for a one-story plant unit, 120 x 160 ft., to cost about \$45,000 with equipment. Samuel Silvers heads the company.

The S. S. Kimball Brick Co., 133 West Washington Street, Chicago, has concluded arrangements for the purchase of property in the Cullen industrial district, 386 x 411 ft., for a consideration of \$50,000, and plans the establishment of a new brick-manufacturing plant.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has filed plans for a new factory branch and distributing plant at Dubuque, Iowa, one story, 95 x 538 ft., to cost about \$150,000 with equipment. General contract has been let to W. L. Yokom, 730 Main Street.

The City Council, Little Falls, Minn., is considering the purchase of equipment for municipal power service to be installed at the city pumping plant, to include a Diesel oil engine and auxiliary machinery.

C. Lange & Brothers, 2625 Milwaukee Avenue, Chicago, have asked bids on general contract for a six-story automobile service, repair and garage building at Logan Boulevard and Western Avenue, to cost close to \$175,000 with equipment. Clarence Hatzfeld, 7 South Dearborn Street, is architect.

South Atlantic States

BALTIMORE, Sept. 26.

THE Board of Awards, Baltimore, is asking bids until Oct. 5, for pumping machinery and auxiliary equipment for the Montebello water station. Specifications on file at the office of Edward G. Rost, City Hall, water engineer.

The American Oil Co., American Building, Baltimore, is completing plans for a new one-story oil storage and distributing plant in the Curtis Bay section, to cost \$35,000 with equipment. T. J. O'Connell is company architect.

The General Garage Mfg. Co., 1912 North Charles Street, Baltimore, manufacturer of sheet metal garages, etc., has an application before the Board of Zoning Appeals for permission to construct a new one-story plant for sheet metal-working.

The Bellmore Mfg. Co., Gainesville, Ga., is in the market for a hand-operated elevator, 1 to 2 tons capacity, about 15-ft. lift.

The Virginia Domestic Coke Corporation, Richmond, Va., now being organized by Charles Loeber, Richmond, construction engineer, and associates, is arranging for a new by-products coke plant in Chesterfield County, near Richmond, for domestic coke and coal by-products production, to cost upward of \$1,500,000 with equipment. Headquarters will be established in the Mutual Building, Richmond. Talbot E. Pierce, Waterford, Va., is president.

The Board of District Commissioners, District Building, Washington, is said to be planning the installation of manual training equipment in the proposed Garnett-Thompson junior high school to cost \$500,000, for which bids will soon be asked on revised plans. A. L. Harris is municipal architect.

The Foster Brothers Mfg. Co., 320 North Holliday Street, Baltimore, manufacturer of metal beds, bed springs, etc., is planning for expansion, with installation of additional machinery, including metal-working, bending and kindred equipment. A controlling interest in the company has recently been secured by the R. C. Heller Co., 36 South Frederick Street, manufacturer of kindred products.

The Miller Mining Co., Cartersville, Ga., operating ochre properties, is considering expansion, with installation of additional machinery. A new railroad line will be constructed from the properties.

H. V. Winston, Claremont, Va., has inquiries out for wood-working machinery, planers, etc., for the production of parquet flooring.

The C. Hoffberger Co., 538 East Monument Street, Baltimore, operating ice-manufacturing and cold storage plants, is said to be planning to ask bids about Oct. 1 for a proposed six-story and basement cold storage and refrigerating plant totaling about 75,000 sq. ft. of floor space, estimated to cost \$500,000 with machinery.

The Board of City Commissioners, Wilson, N. C., is asking bids until Oct. 6 for a portable type air compressor, mounted on steel wheels and axles, with gasoline engine, air receiver, regulator and auxiliary equipment. R. D. Gladding is city engineer.

The National Mfg. & Stores Corporation, 534 North Liberty Street, Winston-Salem, N. C., is considering plans for a new plant for furniture assembling and finishing, to cost more than \$175,000 with equipment. A similar mill is also projected at Greensboro, N. C. L. J. Kahn is vice-president.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a 20 to 25-ton locomotive, saddle tank, standard gage; also for a log loader, 36-in. gage; saw mill complete with equipment.

The Virginia Electric & Power Co., Richmond, Va., has authorized the sale of a preferred stock issue to total \$1,965,600, a portion of the proceeds to be used for extensions and improvements, including transmission line construction. The company has work under way on an addition to its power plant at Norfolk, Va., including the installation of new equipment.

Pittsburgh

PITTSBURGH, Sept. 26.

THE past week has been slow in the local machine tool market, chiefly because the interest of both dealers and buyers has been centered in the exposition at Cleveland. Many negotiations for the sale of tools were transferred to that exhibit where buyers could see the various types of tools they had in mind to purchase. Dealers are still making fairly numerous quotations, but buyers, probably because of the downturn in steel industry activities, seem to be in no great hurry to close.

The Mesta Machine Co., West Homestead, Pittsburgh, manufacturer of hydraulic and electric-operated presses and other heavy machinery, has filed plans for a one-story addition, 80 x 400 ft., to cost close to \$90,000 with equipment.

The Board of Education, Fulton Building, Pittsburgh, has selected a site at Bedford Avenue, Cliff and Crawford Streets, for its proposed six-story boys' trade and vocational school and has approved plans for the structure, estimated to cost \$1,300,000 with equipment. Bids will be asked soon on a general contract. E. B. Lee, Chamber of Commerce Building, is architect. Marcus Aaron is president of the board.

The City Council, Parkersburg, W. Va., has postponed bids from Oct. 10 to Oct. 26 for pumping machinery, pipe collection system, pipe lines, etc., for a waterworks in the Riverside district. Morris Knowles, Inc., Westinghouse Building, Pittsburgh, is engineer.

The Hammermill Paper Co., East Lake Road, Erie, Pa., has awarded a general contract to the Henry Shenk Co., Twelfth and Sassafras Streets, for a three-story addition to its sulphite pulp department, to cost close to \$50,000 with equipment.

The Appalachian Electric Power Co., Bluefield, W. Va., is said to have preliminary plans for extensions and improvements in its steam-operated electric generating plant at Roanoke, Va., including installation of a new 7500-kva. steam turbo-generating unit and auxiliary equipment, to double, approximately, the present capacity. The work is estimated to cost about \$185,000.

The Board of Education, Erie, Pa., contemplates the installation of manual training equipment in a proposed new high school to cost \$1,000,000, for which plans will be drawn by Meyers & Johnson, Erie, architects.

The Standard Plate Glass Co., First National Bank Building, Pittsburgh, has taken bids on a general contract for a four-story factory to cost in excess of \$100,000. Hunting, Davis & Dunnells, Century Building, are architects and engineers. F. E. Troutman is president.

St. Louis

ST. LOUIS, Sept. 26.

BIDS have been asked by the Gleaner Combine Harvester Corporation, Independence, Mo., manufacturer of harvesting and other agricultural equipment, for a one-story addition, to cost about \$80,000 with machinery.

The Department of Public Works, City Hall, Carthage, Mo., will soon begin the construction of a one-story and basement municipal electric light and power plant, 70 x 150 ft., to cost about \$65,000 with machinery. A steel tank with 100,000 gal. capacity, on elevated steel tower, will be installed. E. S. Glenn is city engineer.

The Crane Co., 836 South Michigan Avenue, Chicago, has asked bids on a general contract for a two-story factory branch and distributing plant addition at Wichita, Kan., to cost about \$55,000. Boucher & Overend, National Bank Building, Wichita, are architects.

The Nicholas-Beazley Airplane Co., North and English Streets, Marshall, Mo., Russell Nicholas, president, will take bids at once for its proposed new plant for the manufacture of aircraft and parts, including assembling department, consisting of two one-story units, 80 x 160 ft., and 32 x 300 ft., to cost about \$40,000 with equipment.

The Missouri-Kansas-Texas Railroad Co., Muskogee, Okla., has awarded a general contract to the Austin Brothers Construction Co., Austin, Tex., for a one-story forge and blacksmithing shop at its local repair shops. The company will also build a one-story woodworking plant, for which contract also has been let to the Austin Brothers.

The Oklahoma Natural Gas Co., Kennedy Building, Tulsa, Okla., operated by the Phillips Petroleum Co., is said to be completing plans for the early construction of a new pipe line from Norge to Oklahoma City, and from Berger to Norge, to cost upward of \$5,000,000.

The Common Council, Kennett, Mo., has plans under way for a new one-story municipal electric light and power plant to cost about \$28,000 with equipment.

The Hillyard Chemical Co., Ninth and Patee Streets, St. Joseph, Mo., has acquired local property as site for a new three- and four-story plant, to cost \$100,000 with equipment. Eugene Meier, Lincoln Building, is architect.

The Board of State Regents, Topeka, Kan., has plans under way for a new power plant at the State Agricultural College, Manhattan, to cost more than \$125,000 with equipment. Charles D. Cuthbert, State House, Topeka, is architect.

The Luna Manganese Co., P. O. Box 502, Deming, N. M., has been incorporated to mine and produce manganese ores. The property controlled by the company is in the Little Florida Mountains, Luna County, New Mexico. The operations to date consist of development of ore with the objective of blocking out sufficient ore to justify the erection of a 100-ton mill. Due to low iron and low silica content, the ore will be produced for chemical as well as metallurgical use. Officers are: W. R. Spencer, president; Charles Franklin, vice-president; G. M. North, Jr., secretary and treasurer.

Cleveland

CLEVELAND, Sept. 26.

INTEREST in the machine tool field the past week was centered in the National Machine Tool Builders' Exposition in this city. Both manufacturers and dealers confined their attention to the exhibit and there was a very good attendance of representatives of railroads, jobbing machine shops and other industries that use machine tools. Manufacturers and distributors were gratified with the interest shown and with the live prospects that were developed. While the trade does not expect that much business will be actually placed during a machine tool show, quite a few single tool orders were taken, the volume of sales being fully up to expectations. The exhibit is expected to stimulate business considerably during the next few weeks.

Bids will soon be asked by the Gallon Iron Works, Gallon, Ohio, for a one-story addition, to cost close to \$40,000 with equipment. Althouse & Jones, Market Building, Mansfield, Ohio, are architects. D. C. Boyd is president.

The Cleveland Railway Co., Hanna Building, Cleveland, has plans for a three-story bus garage, service and repair building, 125 x 125 ft., for passenger motor buses, to cost about \$180,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, are architects and engineers.

The Elyria Iron & Steel Co., 232 East 131st Street, Cleveland, has filed plans for a one-story addition, 140 x 160 ft., to cost more than \$100,000 with equipment. General contract recently was let to the H. K. Ferguson Co., 4900 Euclid Avenue.

Fire, Sept. 19, destroyed a portion of the storage and distributing plant and yard of the Shuer-Hettner Iron & Steel Co., Toledo, Ohio, with loss reported in excess of \$30,000.

The Berger Mfg. Co., Belden Avenue, Canton, Ohio, manufacturer of sheet metal and other metal products, has awarded a general contract to the R. H. Evans Co., Daily News Building, for rebuilding the portion of its plant recently destroyed by fire. The new unit will be one-story and cost approximately \$80,000 with equipment.

The Standard Saw Mill Co., 2705 East Fifty-fifth Street, Cleveland, has filed plans for a two-story machine shop addition, 50 x 100 ft., to cost close to \$30,000 with equipment.

The L. & M. Bearing Co., 212 East Market Street, Lima, Ohio, is said to be planning the purchase of a drill press and other equipment.

Indiana

INDIANAPOLIS, Sept. 26.

THE Delta Electric Mfg. Co., Marion, Ind., has concluded negotiations for the purchase of the plant and property of the Accessories Mfg. Co., 2327 North Crawford Avenue, Chicago, manufacturer of automobile specialties. The purchasing company plans to remove the Chicago works to Marion where operations will be concentrated and increased for the production of automobile headlights, electric lanterns, automobile accessories and radio apparatus.

The Lavelle Foundry Co., Anderson, Ind., is completing

plans for the early construction of a new three-story foundry unit, to cost upward of \$65,000 with equipment.

Adolf Scherrer, Indiana Trust Building, Indianapolis, architect, is arranging for the immediate erection of a proposed three-story automobile, service, repair and garage building, to cost approximately \$100,000 with equipment.

The Indianapolis Pump & Tube Co., New City Trust Building, Indianapolis, will remove the local plant of the Reflex Lamp Works, lately acquired, to its plant at Columbus, Ind., where a division will be arranged for the manufacture of automobile lamps, spotlights, etc.

The Board of Education, Elkhart, Ind., will soon take new bids on a general contract for a two-story vocational school, to cost about \$100,000 with equipment. Former bids have been rejected. H. Miller, 539 Monger Building, Elkhart, is architect.

The Kingston Products Corporation, Kokomo, Ind., has been organized with a capital of \$1,500,000 to take over and consolidate the Kokomo Brass Works, Inc., the Byrne-Kingston Co., and the Kokomo Electric Co., all of Kokomo. The new company plans to develop increase in present output in the line of brass, bronze and affiliated metal goods. Paul Johnson is president and general manager.

The American Lawn Mower Co., Muncie, Ind., has awarded a general contract to A. J. Glaser, 616 East Mulberry Street, for a new one-story building at its plant to cost approximately \$25,000.

The Keen Foundry Co., Griffith, Ind., has been incorporated with capital stock of \$40,000 and will specialize in the manufacture of light gray iron castings. The foundry will be in operation about Oct. 15.

The Marshall Electric Co., Elkhart, Ind., is erecting an addition which will provide 5000 sq. ft. of increased floor space.

Cincinnati

CINCINNATI, Sept. 26.

ATTENTION focused the past week on the National Machine Tool Exposition at Cleveland which was regarded by builders as an unqualified success from the standpoint of attendance of buyers. While several orders were placed at the exposition, the greatest benefit in sales is expected to accrue in the next month. Many purchasers gathered data which will be relied upon in deciding what tools will be bought in the near future. Exhibitors were particularly pleased with the inquiries received and with the fact that among the guests were numerous representatives of automobile companies, electrical manufacturers and railroads. A local builder has sold 11 lathes to an Eastern company, and the Ford Motor Co. has contracted for seven special milling machines.

The City Council, Columbus, Ohio, has approved a bond issue of \$425,000 for the establishment of a municipal airport, including hangars, machine and repair shops and other mechanical buildings.

The Department of Water, Springfield, Ohio, plans the installation of pumping machinery and power equipment in connection with proposed extensions and improvements in the municipal waterworks, for which a fund of \$421,000 is being arranged. R. W. Flack is city manager.

The Kentucky Utilities Co., Starks Building, Louisville, is arranging an appropriation of \$500,000 for extensions and betterments in power plants and transmission system, including the construction of a steel tower line from Earleton to Morganfield, with automatic power substation, etc. The capacity of the substation at Princeton, Ky., will be increased.

The Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Oct. 3 for 452 wrenches, cylinder stud nut, circular 97; until Oct. 7 for 31 propeller split hubs, circular 92, and until Oct. 10 for a quantity of stub tooth gears, circular 89.

The Broad Street Garage Co., Chattanooga, Tenn., is completing plans for a four-story service, repair and garage building, to cost close to \$130,000 with equipment. C. T. Jones, James Building, is architect.

The Cambria Coal Co., Knoxville, Tenn., has inquiries out for an exhaust mechanical fan, capacity 50,000 cu. ft., inclosed type.

The Columbus Merchants' Garage Co., 98 North Front Street, Columbus, Ohio, has awarded a general contract to Forman & Putnam, Marietta, for a six-story and basement service, repair and garage building, 125 x 188 ft., to cost \$335,000 with equipment.

The Reed Air Filter Co., Central Avenue, Louisville, has taken out a permit for its one-story addition, 100 x 200 ft., to double approximately the present floor area.

P. J. Bradshaw, International Life Building, St. Louis,

architect, is completing plans for a two-story automobile service, repair and garage building at Louisville, 100 x 300 ft., to cost upward of \$200,000 with equipment.

Milwaukee

MILWAUKEE, Sept. 26.

MACHINE-TOOL builders are encouraged by the interest aroused by the Cleveland exposition and the prospect for equipment buying as a result. While a number of factors are restricting new business, especially from the automotive industries, trade is undoubtedly becoming more active and the outlook is better than a year ago. Sales volume has been increasing slightly, and September bookings, as a rule, are reported somewhat greater than those in August.

The Lewis-Shepard Co., Boston, Mass., manufacturer of industrial lifting jacks and arc-welded steel frame platforms for material handling in shops, has established a western branch at West Bend, Wis., taking over a factory which has been idle for several years. New equipment is being installed.

The Sun-Ray Mfg. Co., 720 South Main Street, Oshkosh, Wis., manufacturer of electric heating pads and other specialties, sustained an estimated loss of \$5,000 by fire on Sept. 17. Replacement of equipment and repairs to the building are now being made.

In addition to erecting a new wing, five stories, 130 x 200 ft., to the plant of the Seaman Body Corporation at Milwaukee, the Nash Motors Co., Kenosha, Wis., has plans for additions costing \$500,000 to the branch factory at Racine, Wis., and enlargement of the mills of the Seaman-Dunning Co. at Pine Bluff, Ark., furnishing wood supplies to the Seaman plant in Milwaukee, at a cost of \$350,000. Contracts are being let for a new heat treating building, 90 x 170 ft., and a steel storage building, 40 x 100 ft., at Racine, as the first units of immediate extensions. The Milwaukee plant addition will cost \$450,000. D. M. Averill is general manager at Racine.

The Aluminum Goods Mfg. Co., 1500 Franklin Street, Manitowoc, Wis., has plans by Lockwood, Greene & Co., architects and engineers, Chicago, for additions at the branch plant in Two Rivers, Wis., to cost \$450,000. It is believed unlikely, however, that the commencement of the work will be authorized before next spring. George Vits is president.

The American Electric Motors, Inc., 57 Erie Street, Milwaukee, has disposed of a controlling interest to the Splittorf Electric Co., New York, a subsidiary of the Splittorf-Bethlehem Electric Co., which will continue the business on an enlarged scale. The American company erected a new factory at Cedarburg, Wis., a year ago, but has been handicapped by lack of adequate working capital. It manufactures stationary electric motors featuring a patented armature inclosure to exclude dust, dirt, grease and moisture. The Splittorf company plans to enlarge the line to include motors up to 30 hp., and will install additional machinery at once. The operation will be by a new corporation, the Splittorf Electric Co. of Wisconsin, formed under the laws of this State, with an initial capitalization of \$25,000.

The D. J. Murray Mfg. Co., 1002 Third Street, Wausau, Wis., builder of logging and saw and planing mill machinery, has broken ground for a new foundry, 66 x 128 ft., and is making other improvements estimated to cost \$50,000. Theodore Kohl, 924 Jefferson Street, Wausau, is general contractor.

The Common Council, Kenosha, Wis., expects to call for bids Jan. 1 for the construction and equipment of a new unit of the municipal waterworks filtration plant to cost \$95,000. The engineers are Burdock, Alvord & Howson, 8 South Dearborn Street, Chicago. C. M. Osborn is city manager.

The McVicker Railclamp Tieplate Co., Majestic Building, Milwaukee, has changed its corporate name to the McVicker Rail Anchor Co. to conform to the product the company sells. It no longer manufactures rail clamps, but is limiting its business to the manufacture of rail anchors and tie plates. Both are made on contract and the company will shortly take bids for their manufacture for another year.

Gulf States

BIRMINGHAM, Sept. 26.

THE Texas-Louisiana Power Co., Fort Worth, Tex., has plans under way for a new steam-operated electric power plant at Texas City, Tex., to include the construction of transmission lines to Dickenson, League City and vicinity. The entire project will cost about \$350,000.

The Industrial Armature Works, Inc., New Orleans, is planning the early rebuilding of the portion of its plant

destroyed by fire Sept. 16, with loss reported at \$50,000 including equipment.

The Northern Texas Traction Co., Pine and Pacific Streets, Fort Worth, Tex., has plans for a one-story machine and repair shop, and garage building, 65 x 92 ft., and 32 x 165 ft., respectively, for company motor buses.

The Southern Gas Utilities, Inc., Houston, Tex., recently formed under Delaware laws, is disposing of a bond issue of \$2,250,000, a portion of the fund to be used for the acquisition of natural gas properties, pipe lines, etc., in Webb and other counties, including expansion in present facilities and construction of new pipe lines, compressor stations, etc.

The Star Fish & Oyster Co., Canal Street, Mobile, Ala., is planning the erection of a one-story ice-manufacturing plant, 40 x 45 ft., and cold storage and refrigerating plant, 100 x 125 ft. The entire project will cost more than \$100,000 with equipment.

The Central Power & Light Co., Frost National Bank Building, San Antonio, Tex., is planning extensions and improvements in its power house and ice and cold storage plants. The entire project will cost approximately \$100,000 with equipment. Work will begin in about 30 days.

The Humble Oil & Refining Co., Houston, Tex., has approved plans for the erection of a new refinery at San Antonio, Tex., to replace a unit which was discontinued several years ago. It will be equipped for a capacity of 5000 bbl. per day. A portion of the machinery will be secured from a refinery at Burkburnett, Tex., closed about three weeks ago. A 4-in. pipe line will be installed from the pumping plant at Lytle, Tex., to the new refinery.

The Common Council, Eupora, Miss., will install pumping machinery and power equipment in connection with a proposed municipal waterworks. A bond issue of \$60,000 has been approved for the project.

W. M. Smith & Co., Birmingham, machinery dealers, have inquiries out for machine tools and kindred equipment, including a 30-in. lathe, two electric hoists, each 1000 lb. capacity; bulldozer, with 30-in. opening; bolt threader, Landis type; milling machine, radial drill, shaper, splitting shear for handling sheet metal, alligator shear, and 150-kw. generator set.

Officials of the O. B. Andrews Co., Inc., Rosevale Avenue, Chattanooga, Tenn., manufacturer of paper products, have formed a subsidiary, to be known as the O. B. Andrews Co. of Texas, Inc. A building has been leased at Jackson and Commerce Streets, Houston, Tex., and will be remodeled for the manufacture of fiber boxes and containers. The plant will represent an investment of close to \$100,000 and is scheduled for production by the close of the year. The new company will operate in conjunction with the Atlanta Container Corporation, Atlanta, Ga., another Andrews company interest. P. F. O'Dwyer will be manager at Houston.

The Common Council, Center, Tex., J. W. Shotwell, city manager, is asking bids until Oct. 6 for a steel water tank with capacity of 100,000 gal. on elevated steel tower.

The Louisiana Natural Gas Co., Monroe, La., is said to be planning the construction of a new pipe line for service at Gretna, Westwego and vicinity, where franchises have been secured. The work is reported to cost more than \$150,000 with equipment.

The Southern Ornamental Iron Works, Inc., Dallas, Tex., has authorized plans for a new one-story branch plant at Arlington, Tex., to cost close to \$60,000 with equipment.

Detroit

DETROIT, Sept. 26.

THE Olds Motor Works, Lansing, Mich., has begun superstructure for a number of new buildings in connection with an expansion program to cost \$3,000,000. The main unit of the group will be 900 ft. long. The former Seager Engine Co. plant, one of the original buildings of the Olds works, has been razed to make way for a new unit. General contract for the expansion has been let to the Reniger Construction Co., Lansing.

The Vento Steel Sash Co., Muskegon Heights, Mich., is reported to be planning the erection of a new one-story plant unit, to cost about \$20,000 with equipment.

The Bound Brook Oil-less Bearing Co., Bound Brook, N. J., manufacturer of automobile bushings, bearings, washers, etc., has concluded arrangements for the purchase of a controlling interest in the Sauzedde Corporation, 209 East Baltimore Street, Detroit, manufacturer of aircraft wheels, brakes, etc. The purchasing company will continue operations at the same location, as heretofore.

The Holland Furniture Co., Holland, Mich., is said to be completing plans for a new multi-story unit, to cost more than \$60,000 with equipment.

The Scott Brothers Electric Co., 418 Macomb Street, Detroit, is said to be planning the purchase of a lathe, welding equipment and other tools for a metal plating shop.

The Sun Oil Co., Finance Building, Philadelphia, has acquired the Big Chief Oil Co., Wyandotte, Mich., and will operate as a subsidiary. The new owner is said to be planning expansion, including increased storage and distributing facilities.

The Robert Automatic Screw Co., 2409 Michigan Avenue, East, Jackson, Mich., is considering the early rebuilding of the portion of its plant destroyed by fire Sept. 12, with loss reported at close to \$50,000 including equipment.

The Board of Education, Muskegon, Mich., has plans under way for extensions and improvements in its manual training school on Hackley Street, including the installation of additional equipment, to cost about \$75,000. Frank Forster, Lyman Block, is architect.

The Jackson Steel Products Co., Jackson, Mich., a division of the General Motors Corporation, Detroit, is completing negotiations for the purchase of a portion of the local plant of the Kelsey-Hayes Wheel Co., manufacturer of automobile wheels, and will use for expansion.

The Mueller Brass Co., Port Huron, Mich., has concluded arrangements for the purchase of two additional tracts of land in the vicinity of its plant to be used for extensions in connection with a general expansion program now under way.

The Yeager Bridge & Culvert Works, Inc., Port Huron, Mich., has filed plans for a new unit to cost about \$80,000 with equipment, designed to replace the portion of the works recently destroyed by fire.

The AC Spark Plug Co., Flint, Mich., is erecting another building to its East Side works which will provide additional manufacturing facilities in the main plant. The company has just completed the construction of four new buildings for increased production of its automobile accessories. It is also completing a new factory in Paris and additions have recently been made to its plant at Birmingham, England. Albert Champion is president of the company.

The Witmer Roller Bearing Co., 2150 Manistique Avenue, Detroit, has been incorporated and will get in production soon in the manufacture of frictionless roller bearings. The company may be in the market shortly for machinery and equipment, although there is a possibility that some of its work at first may be made on contract. Ben Witmer is president, David R. Witmer is vice-president, Benjamin R. Witmer is secretary and Charles E. Witmer is treasurer.

The F. Raniville Co., Grand Rapids, Mich., manufacturer of leather belting, has just been incorporated, although the business was founded in 1874. The founder, Felix Raniville, died in 1902 and the business is conducted by his sons. Officers of the corporation are Francis F. Raniville, president and general manager; Eugene Raniville, vice-president; W. F. Powers, secretary and treasurer.

Pacific Coast

SAN FRANCISCO, Sept. 21.

BIDS will soon be asked by the Crane Co., San Francisco, with headquarters at 836 South Michigan Boulevard, Chicago, for a one-story addition to its local factory branch and distributing plant, including improvements in present pipe shop and warehouse, to cost close to \$50,000 with equipment. Lewis P. Hobart, Crocker Building, San Francisco, is architect.

The McCormick Foundry Co., Folsom and Main Streets, San Francisco, is planning the early rebuilding of the portion of its iron foundry destroyed by fire Sept. 13, with loss reported at close to \$40,000 including equipment.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has arranged for a bond issue of \$15,000,000, a portion of the proceeds to be used for expansion in power plants and transmission lines.

The Standard Gasoline Co., Ventura, Cal., has plans under way for extensions in its gasoline refining plants, with installation of additional equipment to increase the capacity from 75,000 to 100,000 gal. per day.

The Zellerbach Paper Co., Sacramento, Cal., plans to rebuild the portion of its plant destroyed by fire Sept. 16, with loss estimated in excess of \$100,000 including equipment. The same fire destroyed a part of the works of the Ward Steel Co., on neighboring site, with loss reported at more than \$40,000 with equipment. The latter plant also will be rebuilt.

The Common Council, Manti, Utah, is considering the purchase of a Diesel oil engine and auxiliary equipment for municipal power service and will soon ask bids.

The City Council, Long Beach, Cal., plans the installation of a sewage pumping plant in connection with a proposed system for service in the industrial section of the city. A fund of \$750,000 is being arranged for the project. H. Peterson is sanitary engineer.

The B. G. Ewing Paper Co., Spokane, Wash., is planning to rebuild its storage and distributing plant destroyed by

fire Sept. 16, with loss reported at close to \$110,000 including equipment and stock.

The South Prairie Lumber Co., South Prairie, Wash., vicinity of Tacoma, is said to have plans for rebuilding the portion of its mill recently destroyed by fire, with loss reported at close to \$100,000 including machinery.

The Northwest Pulp & Paper Co., Astoria, Ore., is planning the early construction of a new pulp and paper mill to cost more than \$750,000 with machinery.

The Board of Education, Monrovia-Arcadia-Duarte High School District, Monrovia, Cal., plans the construction of a one-story manual training building in connection with a proposed new high school group at Monrovia to cost \$500,000. John C. Austin and Frederic M. Ashley, Chamber of Commerce Building, Los Angeles, are architects.

Canada

TORONTO, Sept. 26.

ACTIVITY in machine tools still prevails in this market, although sales for the most part are for single items. Buying for automotive account is the most prominent, changes in plant arrangement and extension of manufacturing facilities having resulted in a number of orders during the past two months and others are expected to be placed soon. While much equipment for general industrial expansion has been purchased there is still a considerable volume yet to be bought.

The Dominion Envelope & Cartons Co., Ltd., Toronto, has purchased a site of $8\frac{1}{2}$ acres on Cherry Street, and will erect a mill with a daily capacity of 125 tons. Contract for the buildings has been awarded to the Toms Construction Co., and work is expected to begin soon.

Fraser Companies, Ltd., Edmundston, N. B., has an expansion program under way and proposes to spend several millions of dollars on its mills in Canada and the United States.

The Goodyear Tire & Rubber Co. of Canada, Ltd., Bowmanville, Ont., will start work immediately on a two-story, 60 x 60 ft. addition to the west wing of its plant. Construction is under way on a \$100,000 addition to the east wing.

Scholler Brothers, Philadelphia, Pa., and St. Catharines, Ont., have awarded a number of contracts in connection with the erection of a soap factory at St. Catharines, Ont.

The Canadian National Electric Railways, 1 Toronto Street, Toronto, propose to start work next spring on the erection of a power house and car barns at Oshawa, Ont. H. L. Vercol is engineer.

Tenders have been received for an addition to the plant of the Callender Foundry & Mfg. Co., Ltd., Guelph, Ont. Construction work will start soon.

Engineers of the International Paper Co., Montreal, have completed surveys at Dalhousie, N. B., where the company proposes to start work at an early date on the erection of paper and pulp mills.

Western Canada

The Ladner Lumber Co., Ladner, B. C., whose plant was recently destroyed by fire with a loss of \$200,000, will rebuild immediately.

The Capilano Timber Co., Capilano, B. C., will build an addition to its mills to cost \$200,000, and will spend \$75,000 on the purchase of new equipment.

Morrissey, Fernie & Mickel, Ltd., subsidiary of the Crow's Nest Pass Coal Co., plans an expansion program at Fernie, B. C., which will include the erection of two new buildings, one to be a warehouse and the other a combined locomotive house and car repair shop.

Foreign

THE Amtorg Trading Corporation, 165 Broadway, New York, official purchasing agency for the Soviet Russian Government, will soon place orders for hydroelectric power equipment in connection with the Dnieper River project in that country, on which work recently has commenced under the direction of Col. Hugh L. Cooper, of Hugh L. Cooper & Co., 101 Park Avenue, New York, consulting engineers. Purchases at this time are expected to reach about \$5,000,000 and additional equipment will be contracted for later. The Amtorg organization will also purchase agricultural and farm machinery, including tractors, etc., to be available for service in Russia early next spring. Saul G. Bron is chairman of the board of the purchasing agency.

The Eifel Power Co., Essen, Germany, organized several months ago to construct and operate a hydroelectric generating plant in the valley of the Our River, a tributary of the Rhine River, near Bitburg, has begun preliminary work on the project. It is expected to require from six to seven years

for completion, and will represent an investment of about 120,000,000 marks (approximately \$30,000,000), including transmission system. The municipal authorities at Bitburg are interested in the enterprise. The American Consulate, Cologne, Germany, J. Klahr Huddle, consul, has information regarding the project.

The United Gas Improvement Co., Broad and Arch Streets, Philadelphia, has secured a contract for a complete water-gas generating plant for the city of Rosario, Argentina, to have a capacity of 1,500,000 cu. ft. per day. It will replace a former gas-generating plant now abandoned by the municipality.

The H. J. Heinz Co., 1062 Progress Street, Northside, Pittsburgh, will build a tin can manufacturing plant at London, England, in connection with a new canned food products

factory at that place, in the Harlesden district. It is expected to have the can works ready for service early in the coming year. Both projects are reported to cost upward of \$350,000.

Officials of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., have formed the Compania Electrica Westinghouse de Chile, a subsidiary to operate at Chile and Bolivia, South America. Headquarters will be maintained at Santiago, Chile, with E. L. McCloskey as manager.

The Argentine Minister of Public Works, Buenos Aires, Argentina, is arranging an early call for bids for the construction of a new railroad line from La Paz-Feliciano to San Jaime, to cost about \$4,600,000. The American Consulate, Buenos Aires, Alexander V. Dye, commercial attache, has information regarding the project.

Canadian Output of Pig Iron and Steel Gains

TORONTO, ONT., Sept. 24.—The production of pig iron in Canada in August totaled 63,234 gross tons, which is an increase of 24 per cent over the 50,997 tons produced in July and compares with 58,780 tons produced in August a year ago. A greater output of basic iron accounted for the increase; the production of this grade rose to 45,241 tons from 29,246 tons in the previous month and more than offset a decline in foundry iron output from 21,751 tons in July to 17,993 tons in August. No malleable iron was produced during the month under review. For the eight months ended with Aug. 31, 1927, the production of pig iron in Canada amounted to 517,944 gross tons, and was 4 per cent greater than the output of 496,876 tons reported for the corresponding eight months of 1926.

No additional blast furnaces were blown in during the month, and none was blown out or banked. The active furnaces are as follows: Dominion Iron & Steel Corporation (British Empire Steel Corporation), Sydney, N. S., two; Steel Co. of Canada, Ltd., Hamilton, Ont., two; Algoma Steel Corporation, Sault Ste. Marie, Ont., two.

The production of ferroalloys in Canada amounted to 4839 tons in August, a slight increase over the 4510 tons produced in July.

Steel ingots and castings produced in August amounted to 77,479 tons, an increase of 40 per cent over the 55,250 tons made in July and the greatest output reported for August since the record of 105,055 tons made in 1923. Output of steel ingots advanced to 74,319 tons from 52,776 tons in July, and the tonnage of direct steel castings increased to 3160 tons from 2474 tons in the previous month.

For the eight months ended with August the production of steel ingots and castings totaled 620,039 tons, as compared with 541,705 tons produced during the corresponding eight months of 1926. This year's output included 589,488 tons of steel ingots and 30,551 tons of direct steel castings.

Canadian pig iron prices, following reductions in United States prices, moved to lower levels during August. The Dominion Bureau of Statistics' index number for iron and steel and their products (1913 prices = 100) fell from 143.6 to 142.6 during the month of August, chiefly because of the decline in prices of pig iron and cast iron pipe.

Building Operations in First Half of 1927

In the first half of 1926 permits covered an expenditure of \$1,474,785,929 for new buildings in 78 American cities of 100,000 population or over. In the first half of 1927 the amount for new buildings was \$1,381,910,891, which was 6.3 per cent less than in 1926.

These 78 cities provided dwellings in new buildings for 201,685 families in the first six months of 1926 and for only 187,133 families in the first six months of this year. This is a reduction of 7.3 per cent.

In the first half of 1926 the number of families provided for in one-family dwellings was 36.7 per cent of all families provided for in new residences. In the corresponding period of 1927 this ratio had fallen to 34.6 per cent. In contrast, the percentage of families provided for in apartment houses rose from 49.9 per cent in 1926 to 51.7 per cent in 1927.

Unusually High Imports of Iron Ore

Not since July, 1923, has so large a tonnage of iron ore come in as in August, 1927, according to figures of the Bureau of Foreign and Domestic Commerce, Washington. The total of 303,586 tons compares with 252,162 tons in July. Unusually heavy receipts in the summer of 1923 brought the July total to 439,367 tons. The current total is higher, for the single month, than the 264,318 tons of the entire fiscal year ended June 30, 1922. Particulars of the recent movement are shown in the table.

	August		Eight Months Ended August	
	1927	1926	1927	1926
Chile	121,300	131,400	893,600	929,200
Cuba	22,000	66,800	272,613	382,500
Spain	7,698	3,357	11,617	82,412
Sweden	41,881	7,884	195,134	22,805
French Africa	74,579	23,654	337,623	228,191
Canada	5,513	763	13,303	14,748
Other countries	30,615	25,293	155,290	82,126
Total	303,586	259,151	1,879,180	1,741,982

Canadian Automobile Production

August production of automobiles in Canada, as reported by the Dominion Bureau of Statistics, included 10,139 passenger cars and 2387 trucks, compared with production in July of 8719 passenger cars and 2268 trucks, and production in August, 1926, of 12,782 passenger cars and 2503 trucks.

Continuing the decline from the high point of \$29.78 in March, average weekly earnings in New York (State) factories are reported by the State Industrial Commissioner at \$28.95 in July. The figure is the highest for any July on record and is higher than that for any month preceding December, 1925.

Aircraft produced in 1924 in 44 establishments amounted to a value of \$12,524,719. This was slightly lower than in 1923. Wage earners numbered 2701.

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